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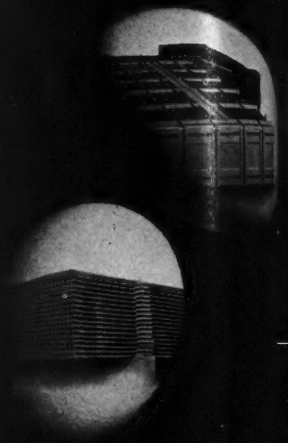

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CALIFORNIA
OIL WORLD
and Petroleum Industry

PUBLISHED TWICE A MONTH — ENGINEERING — TECHNOLOGY — LATEST NEWS

SECOND ISSUE
JUNE 1942
VOL. 35 NO. 12
WHOLE NO. 1611

IN THIS ISSUE

California Refiners Say, "Hang the Costs—We Must Win a War"..... 5

Our Synthetic Rubber Prospects and the Need for Speed.....14

Evaluation of Synthetic Versus Natural Rubber.....17

Paul Huggins Heads Conservation Committee.....20

Laugh This Off 22

C.N.G.A. Frolic Pictures 23-25-27-29-33

Los Angeles Basin Development.....24

San Joaquin Valley Development.....30

Coastal District Development.....36

Business Directory 38

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LOS ANGELES, CALIFORNIA-MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

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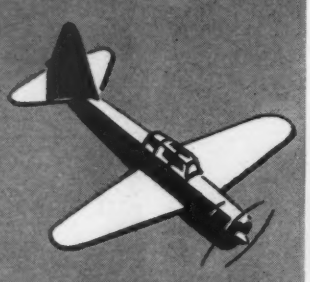
California Oil World and Petroleum Industry is published twice a month at 1009 in the 939 So. Broadway Bldg., Los Angeles, California. Entered as Second-class Matter January 1, 1937, at the post office at Los Angeles, California, under the Act of March 3, 1879. Subscription price $1 per year in U. S. and Possessions, $2 in foreign countries, including Canada. Member of the Audit Bureau of Circulations.

June 23, 1942

Telephone Number TUcker 2571

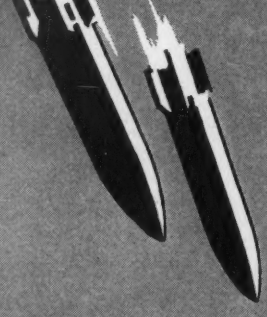
Now WHEN...

HIGH OCTANE



LUBE STOCK

TOLUOL



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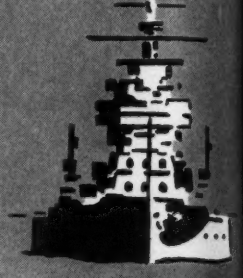

are war necessities... **Dehydrate Efficiently** *and*

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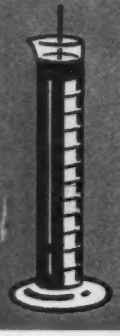
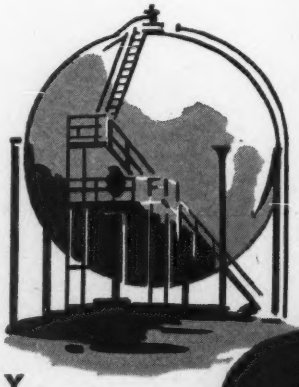
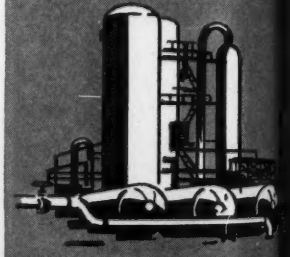


PREVENT VOLUME LOSS

CONSERVE STORAGE SPACE



CURTAIL CORROSION



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DEHYDRATING DESALTING

California Refiners Say "Hang the Costs

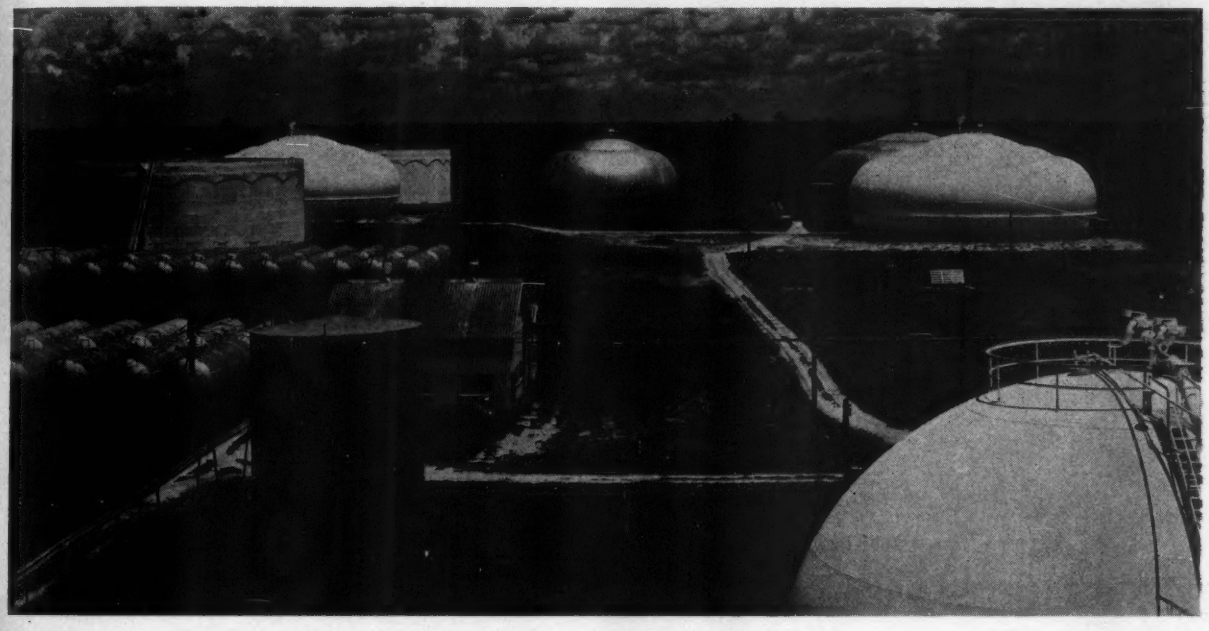
We Must Win This War"

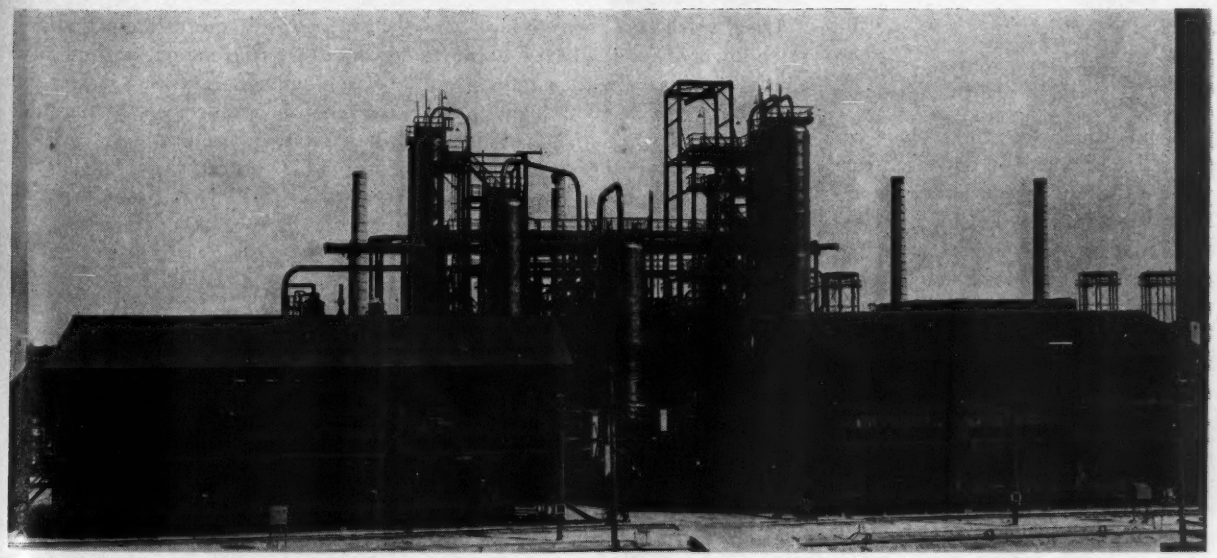
"Hang the costs and consequences NOW, or be resigned to accept the burned earth policy LATER," is the ultimatum which the California petroleum industry has directed to itself. Rather than risk having "too little, too late," several of the largest refiners have dug deeply into their own financial reserves to rush the construction of costly installations which are economically worse than valueless to a nation at peace. A number of natural gasoline manufacturers, whose margin had narrowed even on the less demanding operations, have not hesitated in making outlays for equipment changes and additions to produce the materials needed for War.

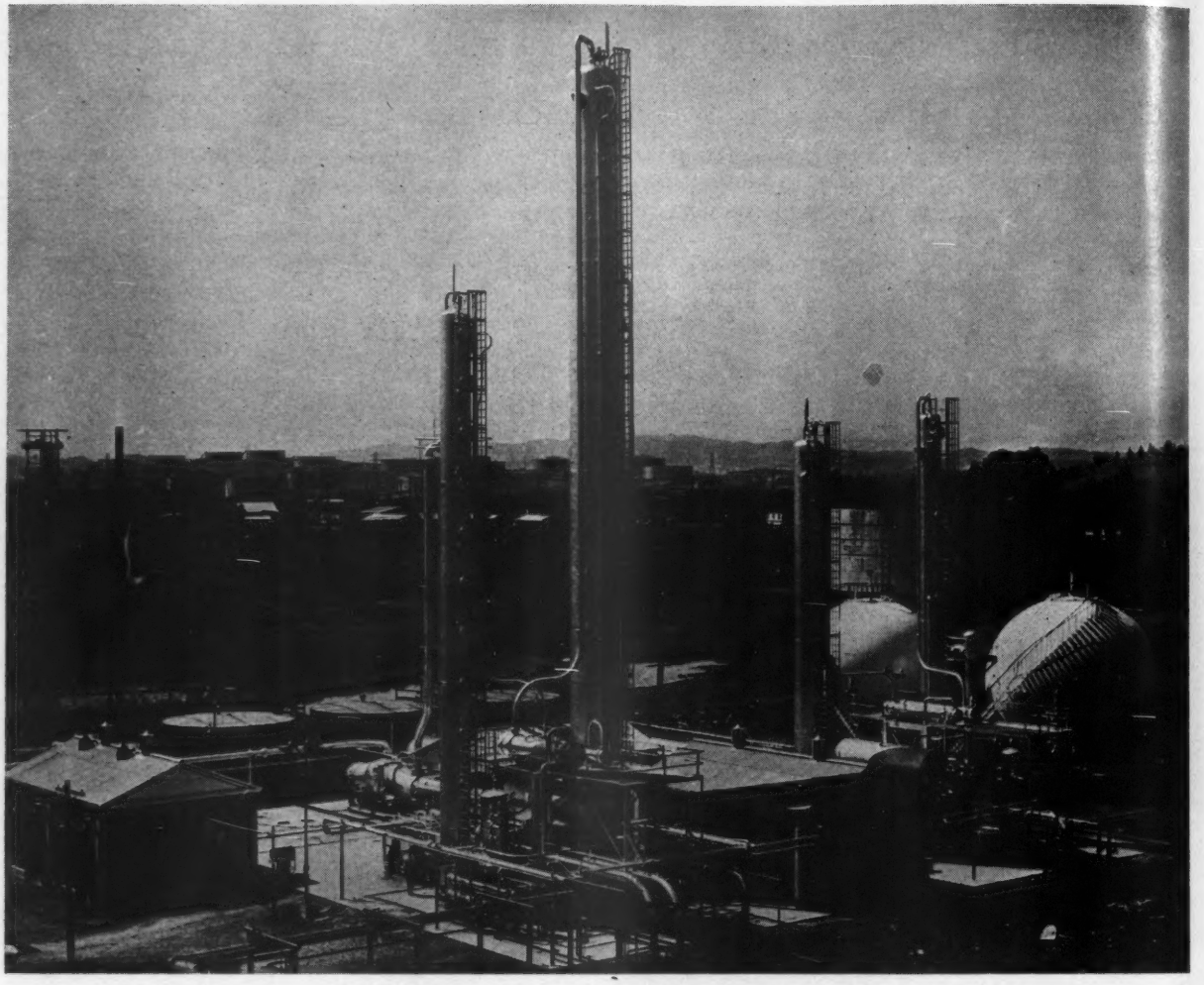
Refiners Footing Bill

California petroleum refiners today are spending an estimated $10,000,000 of their own money on highly specialized plant construction work. War construction and equipment costs to California natural gasoline manufacturers will be considerably less, about $1,000,000, largely because the plants were originally designed to handle relatively pure hydrocarbon fractions and thus more nearly approached

"War Hydrocarbons" require special storage. Plant below specializes in required conversions.







Here the much wanted hydrocarbons are extracted from "wet" natural gas in a California oil field.

the optimum in operation. The most serious trouble facing the natural gasoline manufacturer is marketwise.

Assume Heavy Loan Responsibilities

In addition to these "out of pocket" war purpose expenses carried by the California petroleum industry, is a much larger budget classifiable under government financing, in which the risk is largely underwritten by a federal agency, but the liquidation of which is a responsibility of the units of the industry involved.

California petroleum industry projects of the latter type have, with the best of military reasons, received little or no publicity. However, the few such constructions which have been noted in the daily press represent investments ranging from $400,000 to $15,000,000.

Last week the censorship bars were lowered for the bare statement that a designated Valley refiner had received a government loan of $2,500,000 to finance the installation of facilities for the production of 100 octane gasoline components.

It is also reported in authoritative quarters that two more plants similar to the $15,000,000 plant now underway in the Basin are going up in other California areas to meet the demand for Synthetic rubber.

A glance at the materiel picture and an appreciation of the transport problem, will indicate the importance of California as an unrivalled storehouse of the Arsenal of Democracy.

It is not to be understood that all of this highly specialized construction will be worthless after we win the war. It is quite likely that for many years to come our nation must be self-sufficient in the matter of rubber, for instance. It is possible, likewise, that the products of such formidable processes as dehydrocyclization will have found special uses for making them items of profitable peacetime commerce. It must be remembered, too, that the refining engineer is one of our most resourceful Americans, and that he has converted more than one "white elephant" into a highly useful servant of Man. However, even the most optimistic cannot fail to see the severe drain being made on the personnel and finances of our petroleum industry, and that nothing

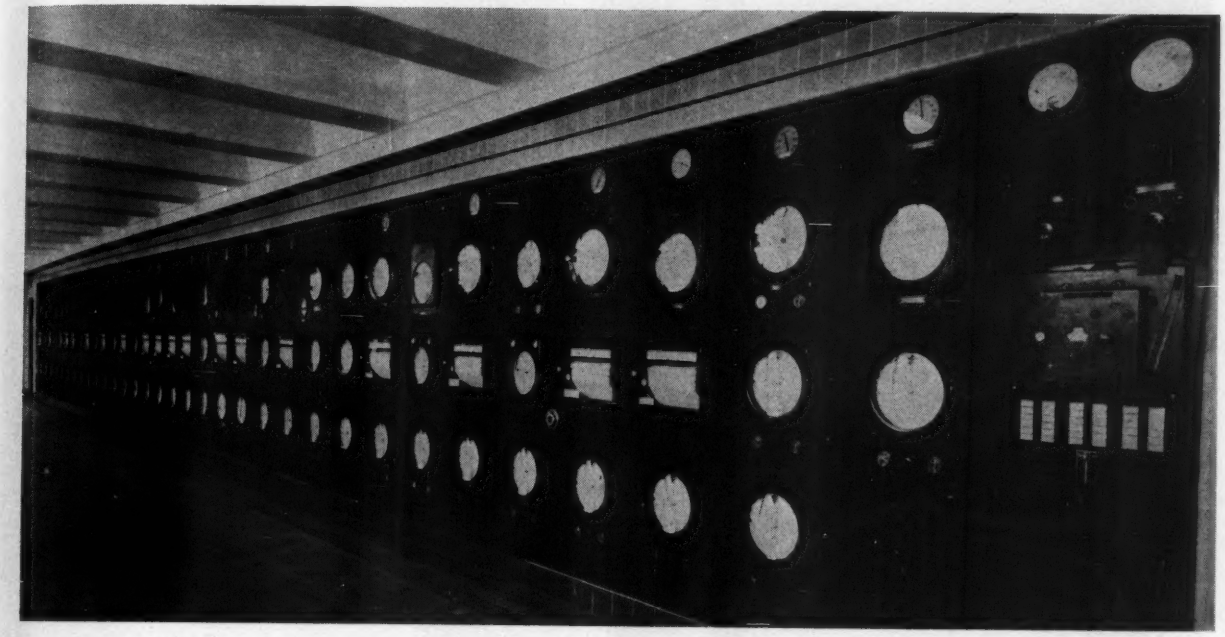
is more important than winning the war as quickly as possible.

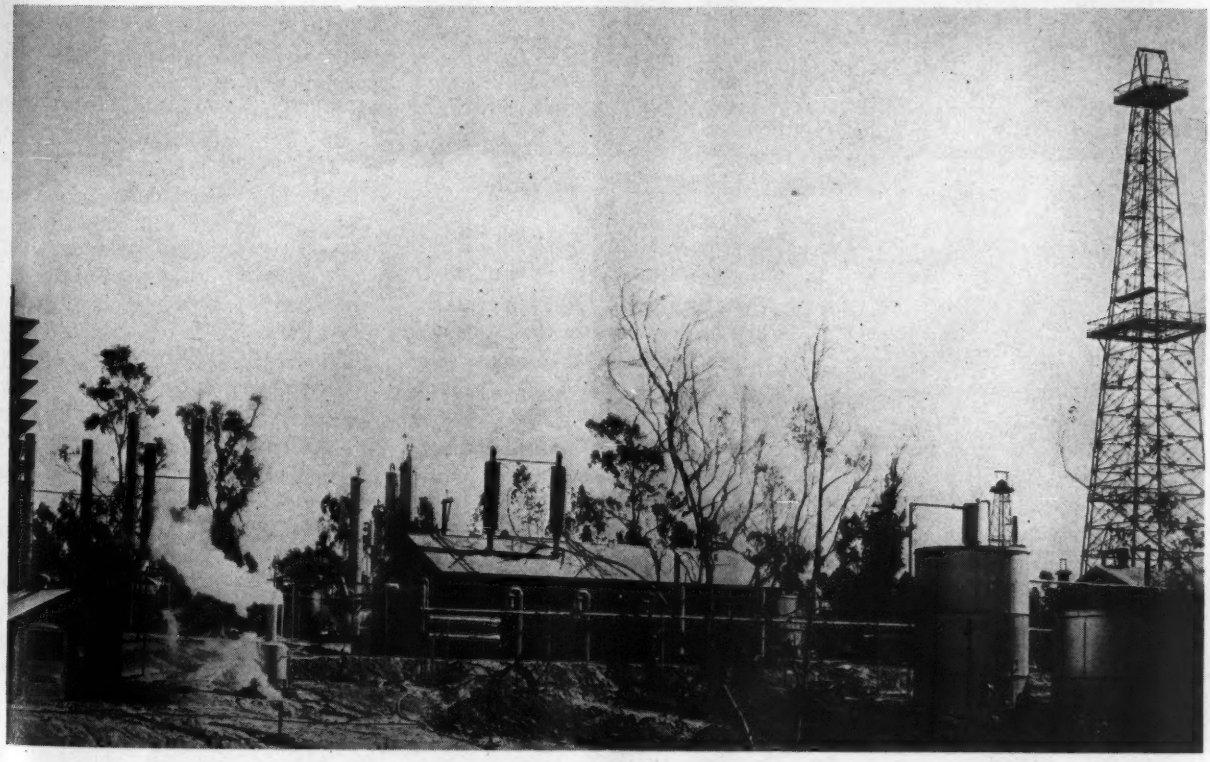
"Win the War" Processes

What our government needs to win the war and what the California petroleum refiners and natural gasoline manufacturers are doing about it, will be the burden of the discussion which follows. An admirable booklet, from which most of the investment and operating cost figures in the following are taken, was recently published by Foster Wheeler Corp.

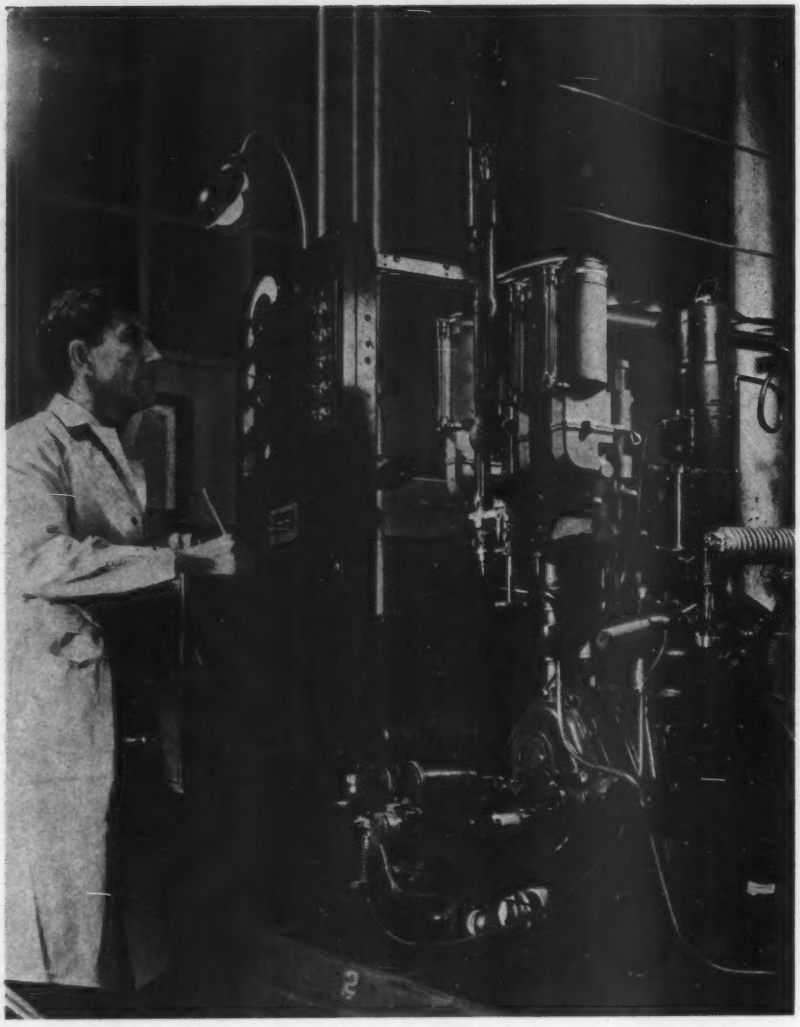
Special Polymerization

Of the two polymerization process types, catalytic and thermal, the former is best known in California. Selective catalytic polymerization converts a butane-butene feed into di-isobutene dimer for hydrogena-





At top is a "Gas Reversion" plant control panel which matches in size one of the numerous natural gasoline plants, below, scattered throughout California oil fields.



The "bouncing pin" says whether Uncle Sam can use the fuel or not.

tion to isoctane. Non-selective catalytic polymerization converts a heavier propene-butene feed into hexanes and is of little interest in this discussion.

Making Isooctane

The process for producing isoctanes by the catalytic polymerization reaction (selective) uses as a charging stock the butane-butene fraction from the stabilizer producing cracked gasoline of the vapor pressure desired. In one plant the BB fraction contains 15 percent of isobutene, 30 percent of normal butene, and 55 percent of normal and isobutanes. The liquid BB charge is passed through a caustic soda scrubber to reduce the percentage of the sulphur components present. The treated material is then pumped through a preheater heated by steam generated by the process, wherein the temperature is raised to about 300 to 350° F. under a pressure of about 600 to 800 pounds. The BB fraction then passes through a solid phosphoric acid catalyst, wherein the exothermic heat of the reaction is controlled by boiling water, the temperature of which is controlled by varying the steam side pressure, and the desired temperature is maintained during the polymerization. Dependent upon the time-temperature conditions prevailing and the percentage of normal to isobutane present in the charge their combination takes place in varying proportions.

Blending Isooctane

The polymer product is then passed to a tower where a separation of the polymer and butane is made, after which it is fractionated into the iso-octenes (dimers) and the dodecenes (trimers). In general, the percentage of isooctenes in the polymer product is about 88 to 90 percent, the balance being trimmers. As an example of performance in an UOP unit, a 30 percent conversion of the above stock to polymer can be effected. This is when producing isooctenes on the basis of a charge of 2:1 ratio of normal to isobutene. The isooctene fraction which boils between 200-260° F., and has an 83 octane number, is hydrogenated to isooctanes of 96 octane rating. The isooctanes being produced commercially have a boiling range of 200 to 260° F. and, therefore, are not a complete motor fuel as to volatility. They require blending with hydrocarbons, such as those of the aviation gasoline boiling range, or isopentane, or isohexanes.

Cost

Currently, catalyst life ranges from 60 to 125 gallons of polymer per pound of catalyst. Ultimate conversion of the feed ranges from 85 to 95 percent. The investment cost of catalytic polymerization plants varies considerably depending upon size, type of feed and construction, but generally runs from $300 to $450 per daily barrel of polymer output.

Pyrolytic Toluol

Gas reversion, or polyforming, is a process of interest here because of the possibility offered for production of such aromatics as toluol and xylols. The processes in general comprise those in which the C_3 and C_4 hydrocarbons are heated and digested together with heavier oils such as naphtha, gas oil and heavy residual cracking stocks for two main purposes: 1. To effect polymerization, alkylation, cyclization, and other reactions by and between the C_3 and C_4 hydrocarbons and the heavier oil being cracked. 2. To di-

lute the heavier oil to permit higher conversion per pass.

Lummus' Smoley and Abbot, in a paper published in California Oil World in the Second Issue, November, 1941, say that it is considered certain that in naphtha gas reversion a substantial portion of the naphtha is converted into gaseous olefins and some paraffins. These, along with any extraneous paraffins that may be introduced to the system, undergo polymerization with olefin polymerization predominating and alkylation taking place to a minor degree. Under certain conditions in this operation, it is possible to make a product high in aromatics.

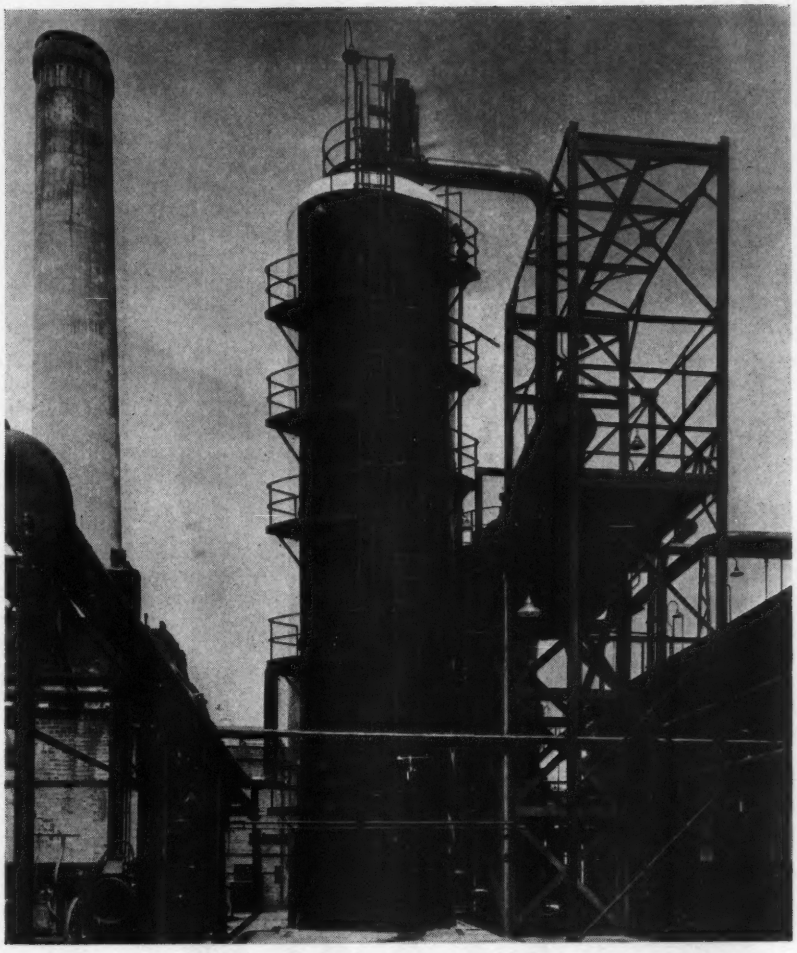
Economical

Published data mentioned above on gas reversion costs indicate an investment of about $135 per daily barrel and direct operating cost of about 13 cents per barrel for a 5000-bbl. self contained naphtha-polyform unit.

Alkylation for Mastery of the Air

A large part of the new construction work now underway in California refineries is in connection with the sulphuric acid alkylation process developed through the combined research efforts of Anglo-Iranian Oil Co., Humble Oil & Refining Co., Shell Development Co., Standard Oil Development Co., The Texas Co. This was the first major process to be placed at the disposition of the government to aid in winning the war.

Catalytic alkylation is currently the most important source of the 94 plus octane constituent used in 100 octane leaded aviation fuels. At present the main use of the process is for the reacting of butylene and iso-butane to form the branched chain 2,2,4, trimethylpentane and similar octanes. The reaction is exothermic and is carried out at temperatures of 30-50° F. which usually requires refrigeration or other cooling means for maintaining the temperature level. The sulphuric acid is used at a concentration of about 98 percent and higher, and after a period of use becomes diluted with hydrocarbons down to 88-91 percent and requires reconcentration or use for other purposes such as lube oil treating.



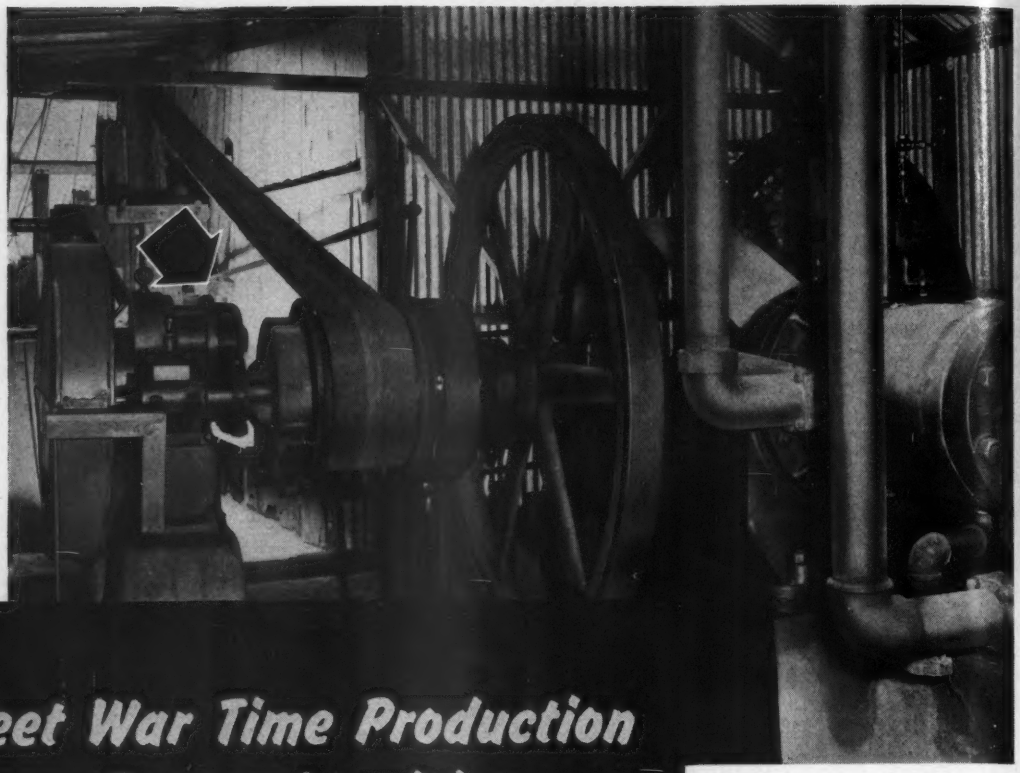
P. D. rerun units are supplying the raw stocks for isooctane and even synthetic rubber in California.

Simple Process

The catalytic alkylation process is simple in essence and the relatively high equipment requirements per unit of alkylate output is chiefly due to the necessity of fractionating feed stocks for the process to a high degree of purity, which is necessary for proper functioning. The total costs of complete plant including the preparation equipment (for separating the feed constituents from available gases or natural gasoline) will run as much as $1500 and over per daily barrel of alkylate capacity. The 92-96-octane product of catalytic alkylation mixed in about the proportions of 40 per cent with 45 per cent of 73 octane straightrun gasoline and 15 percent of isopentane and with 4 cc.'s TEL, will give 100 octane gasoline by the AN-VV-F-746 method. Despite the investment cost such plants show rapid payout possibilities when the alkylate can be marketed at 16 cents per gallon or more, and the isobutane and butylene are readily available. One of the chief limitations to the extent of use of the process is the supply of isobutane and difficulty of separating it.

Producing Isobutane

California has far more than its share of butane and isobutane production, but the availability of the latter isomer must be greatly increased if alkylation is to make great headway in California. As noted above, the sulphuric acid alkylation process combines olefinic frac-



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tions, usually butylenes, with isobutane. The required olefinic material can be made in cracking or reforming equipment, but usually the isobutane accompanying the olefins is of insufficient quantity to carry out the required alkylation step. Until the introduction of the Shell butane isomerization process, it had been necessary for a refiner using alkylation to supplement this deficiency of isobutane by extracting a supply of it from natural gas.

Shell Isomerization

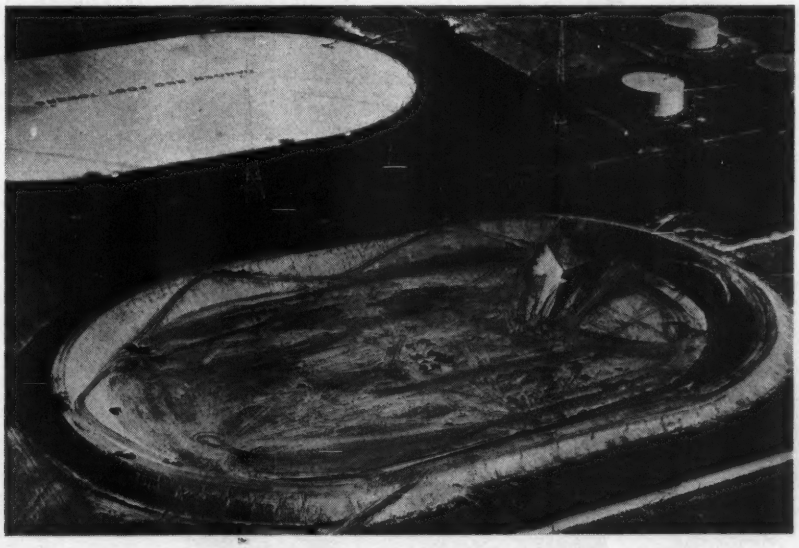
Briefly, the Shell butane isomerization process is one in which normal butane is converted, under the influence of a catalyst, to isobutane. In any naturally occurring mixture of butanes, or synthetically prepared cut of butylenes and butanes, the proportion of normal butane is greater than that of isobutane. Previously the normal butane has been a waste product so far as alkylation is concerned; now it can be converted almost completely into isobutane and thence into alkylate, finally appearing in 100 octane aviation gasoline.

The process consists of passing normal butane in vapor form, at moderate temperature, through a granular bed of catalyst, a constituent of which is aluminum chloride. Dry hydrogen chloride gas is incorporated with the butane vapors; this serves to activate the catalyst.

The discharge from a single pass through the catalyst contains a large proportion of isobutane. This flows through a refrigerated condenser which condenses all the butanes, the hydrogen chloride going into solution. A small amount of uncondensable gas is vented from an accumulator handling the liquid. All condensate is charged to a stripping tower at the base of which a reboiler supplies heat for stripping, while a refrigerator condenser provides reflux from the overhead. This method effects very complete stripping of the bottoms product.

No Special Metals

The overhead vapors from the stripping column are recycled to the inlet of the catalyst chambers. The heat of reaction is low so that no special equipment need be used to maintain the desired temperature for the reaction. No special materials are required for the construction of the plant since dry hydrogen chloride, under the conditions



Earthen storage saves needed metal and bothers the saboteur.

prevailing in the process, is not corrosive. The catalyst has been specially developed for the purpose. It is rugged, cheaply produced, and has long life; these factors combined make its regeneration unnecessary. The catalyst is resistant to poisons but it is necessary to reduce the production of olefins and pentanes in the charge stock to a low figure as both of these produce objectionable by-products and tend to shorten the life of the catalyst.

According to some estimates, one type of isomerization plant (for converting normal butane to isobutane) will require an investment of about $350 to $400 per daily barrel for capacities in the range of 700-1000 barrels, and can be operated from about 1¼ to 1½ cents per gallon of product. It is understood that isomerization in combination with alkylation and the dehydrogenation of butanes to butene, for the production of aviation fuels from natural gasoline sources is estimated to involve an initial investment of around $2000 per daily barrel of alkylate capacity.

Dehydrogenation

The greatly increased interest in the olefins and diolefins, as will be noted specifically at the conclusion of this discussion, makes the subject of dehydrogenation highly important to California refiners. The basic reaction in the dehydrogenation of a paraffin is:

$$C_nH_{2n+2} \longrightarrow C_nH_{2n}+H_2$$

The dehydrogenation of ethane, propane and butane are of the primary commercial importance, the ethene being usable in thermal alkylation to form neo-hexane and propene and butene in catalytic polymerization or catalytic alkylation to form high octane motor fuels. Also, dehydrogenation to the extent of forming diolefins such as butadiene has recently become of much commercial importance because of the value of this material as a base for rubber substitutes.

UOP'S Egloff, Morrell and Nelson describe plants where a mixture of light hydrocarbons is cracked at 1065-75° F. and 750 pounds to make an olefinic feed for catalytic polymerization, and Phillips' Oberfell and Frey describe plants in which ethane, propane and butane mixtures are cracked at 1400° F. and near-atmospheric pressure to obtain ethylene for thermal akylation. UOP's Grosse et al. report much improved yields of olefins by catalytic dehydrogenation, employing a chromium oxide catalyst on alumina. This indicates the possibility of securing 90 percent or more conversion of the C_3, C_3, and C_4 paraffins to the corresponding olefins and scission of the carbon-carbon bond, prevalent in thermal or cracking dehydrogenation, has been almost wholly suppressed. The catalytic dehydrogenation process operates at atmospheric pressure and 500-700° C.

California Toluol

The hydroforming process is assuring a supply of toluol from California refineries. The process is a development of the research of several companies. The following description is taken from the Foster Wheeler Corp. booklet mentioned early in this discussion:

Hydroforming and Other Aromatization

Aromatization is the general term applying to processes for the converting of aliphatic (straight chain) hydrocarbons to the aromatic or benzene series (ring). Hydroforming is a catalytic process for this purpose in which heavy paraffinic naphtha, for example, is converted in part to benzene hydrocarbons by passing over a catalyst in the presence of hydrogen. Several commercial hydroforming installations are in commercial use or building. The process may be used simply for the improvement of octane number and when operated on selected stocks and under special conditions, for the production of toluol, xylol and other aromatics. Aromatization may also be effected thermally, as in the gas reversion process, making products from which the individual benzene hydrocarbons may be separated. The

Annual Meeting, Board of Directors, California Natural Gasoline Association, Los Angeles, June 9, 1942. Left to right around outside of tables: J. C. Gilbert, Barnsdall Oil Co.; John Rogers, Cooper-Bessemer Co.; W. D. Smith, Wilshire Oil Co.; Ben C. Dumm, Allied Supply Co., Chairman Entertainment Committee; John H. Kunkel, The Fluor Corp., Ltd., Chairman, Publicity Committee; W. W. Robinson, Jr., The Texas Co., incoming President; W. C. Dayhuff, Standard Oil Co. of Cal., outgoing President; George L. Tyler, Secretary, C.N.G.A.; J. B. Taylor, Signal Oil & Gas Co., Chairman, Technical Committee; Geo. C. McLaren, Standard Oil Co. of Calif.; J. S. Fluor, Jr., The Fluor Corp. Ltd.; J. C. Burks, O. C. Field Gasoline Corp.; N. H. Mull, The Texas Co.; Wm. Moeller, Jr., Southern California Gas Co. Left to right around inside of tables: P. S. Magruder, General Pet. Corp.; H. E. Moulton, Chanslor-Canfield-Midway Oil Co.; A. H. Bell, Continental Oil Co.; C. D. Gard, Union Oil Co. of Calif.; Randal Maass, General Pet. Corp., Chairman, Program Committee: D. E. McFaddin, Union Oil Co. of Calif., Chairman, Fall Meeting Committee; Harry Fiske, Ingersoll-Rand Co.; M. L. Fort, Pacific Lighting Corp.

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We are not straying from the beaten path we have laid down for ourselves--i. e., we are not taking on projects foreign to our experience and setup, but rather we are working along the lines of activity for which our organization, personnel, technical knowledge and training fits us best.

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conversion of aliphatic hydrocarbons to the benzene series involve both dehydrogenation and cyclization.

Toluol Yield

The production of 70-90 per cent of the theoretical yield of toluol from normal heptane using catalysts from the group including oxides of chromium, molybdenum and vanadium on alumina or magnesia was reported by Grosse, Morrell and Mattox, of UOP. While the reaction mechanism under such conditions is fairly easily established, the reactions taking place in thermal aromatization such as in gas reversion are less clearly defined.

The first commercial hydroforming unit was erected by Pan American Refining Corp. in Texas for handling as feed about 7500 barrels daily of 40-45 octane heavy naphtha and raising to 80 octane with about 80 per cent yield. The operation is simple in principle, consisting in vaporizing the naphtha feed and passing through a chamber containing a granular catalyst at about 1000° F. along with a preheated stream of hydrogen-containing gas derived from the end products of the process. As the reaction proceeds in the reaction chamber, coke is deposited on the catalyst, decreasing activity and requiring switching to another chamber while the coke deposit is burned off. The equipment for the purging, burning carbon and other operations on the catalyst chambers is somewhat complicated, but with proper control equipment can be made automatic, and entirely satisfactory.

The hydroforming product described above contains some 40-50 percent aromatics of which about one-sixth is toluol with most of the remainder being xylol and heavier aromatics. It is stated that with properly modified conditions as much as 80 per cent of aromatics can be produced.

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Immediately following is a concise statement of our country's and the petroleum industry's outlook in the rubber situation—written especially for California Oil World.

Our Synthetic Rubber Prospects and the Need for Immediate Recognition-Action

By Andrew Tomlin
Rubber Service Department
Monsanto Chemical Company
Akron, Ohio

During the past months much has been said and written regarding the "rubber situation" in the United States. The gloomiest pictures are probably not exaggerations. Our stock pile is diminishing rapidly under our own military and essential civilian demands and the demands of our allies whom we must supply with crude rubber or synthetic rubber replacements.

By next year importations of crude rubber will be reduced to a trickle. Further, our vast immediate needs cannot be eased materially by the production of South and Central American rubbers. Those regions are barely self-sufficient. The notion that guayule, dandelions, golden rod, etc., will solve our immediate pressing problem is merely wishful thinking.

From the direst necessity, therefore, this country has embarked on a program for the making of synthetic rubber. The job is mammoth, and when carried to completion it will be one of the greatest industrial achievements of the United States. This job of making synthetic rubber is not one of conversion of or addition to already existing facilities. A whole new chemical industry must be built from the ground up by men who, of necessity, gain their experience and make their precedents as they go along.

The program calls for the expenditure of hundreds of millions of dollars for plants and equipment. Some of the smaller units are already in production, but the larger ones will not be ready to operate before the end of 1942 or the first part of 1943. An optimistic estimate is that we will produce 300,000 tons of synthetic rubber in 1943. The 1944 production should double this figure. The dollar value of the 1944 production will be approximately $300,000,000 but its real value in terms of a winning war machine cannot be estimated.

The name "synthetic rubber" is loosely applied to a great variety of synthesized products which have rubber-like characteristics. From the chemical viewpoint, the name is incorrect. On the other hand, common usage and the fact that the name "rubber" has come into the language in a generic sense rather than as the name of a definite chemical, justify the use of the term "synthetic rubber". It has been fairly well established that natural rubber is a polymer of isoprene (methyl butadiene) having the empirical formula $(C_5H_8)X$. The value of X varies between 1500 and 4500. Isoprene is not easily made and the product resulting from its polymerization is deficient in rubber-like qualities. Thus, the nearest approach to synthetic rubber in a chemical sense does not produce a material which is usable as a replacement for natural rubber.

1. 3-butadiene (C_4H_6) is chemically akin to isoprene and forms the basis for three of our important synthetic rubbers. It can be synthesized from many hydrocarbons but is derived primarily from petroleum. About 1 per cent or less is recoverable from the normal cracking of petroleum but this does not provide an adequate supply. Butane will probably provide the chief raw material. The butane (C_4H_{10}) is first converted to butylene (C_4H_7) and then into butadiene. It may also be derived from acetaldehyde, which in turn, comes from alcohol. This latter method is considerably more costly and is based on a less abundant raw material. Butadiene may be polymerized into a macromolecule having a molecular weight upwards of 100,000. Here again, as in the case of polymerized isoprene, the

rubber-like qualities of the polymer are of such a low order that the product is of no commercial importance.

The trick, if it can be so called, in making butadiene base synthetic rubbers lies in polymerizing butadiene at the same time and with other dissimilar chemicals. By this technique, called "co-polymerization" a great variety of end products may be obtained.

The most important of these co-polymers is Buna-S, which is the polymerization product of butadiene and styrene (vinyl benzene). The name Buna is of German origin and is coined from the first two letters of the words butadiene and natrium. Natrium is the Latin name for sodium which, in the early days, was used as a catalyst in the polymerization reaction. Buna-S is the synthetic from which will be made the tires or other wheel equipment for our trucks, tanks, big guns and airplanes. Obviously, we will need a great deal of it.

The specific properties of finished Buna-S may be varied widely by such manufacturing factors as the degree of polymerization and the use of modifying additives. When processing Buna-S its properties may also be varied by the choice of compounding ingredients and curatives. Thousands of experiments have and will be conducted toward the end of making the best possible material and using it in the best possible way. It is quite possible that several varieties of Buna-S will be produced; as for instance, there might be one for tread compounds, another for carcass compounds, and still a third for use in mechanical goods.

As things stand today, Buna-S is a usable but not entirely satisfactory replacement for the natural rubber in tires. Buna-S compounds can be mixed and processed readily enough except for a quite troublesome lack of tackiness. A certain degree of tackiness is necessary during the assembly of the parts of a tire on the building machine.

Buna-S tires will give good tread wear but generate heat very badly when used in heavy duty service. This shortcoming is quite serious. The Buna-S compounds in a tire will stand the heat fairly well, but the temperatures reached are harmful to the cotton or rayon cords used in the carcass of the tire. Blends of natural rubber and Buna-S go a long way toward overcoming the bad features of Buna-S. Whether or not blends can be used will, of course, depend on our supply of crude rubber. Meanwhile, it is possible that these problems will yield to intensified research. Perhaps by the time volume production of Buna-S is reached, increased knowledge will permit the manufacture of really excellent heavy duty tires.

Buna-N has been made for several years in this country by a number of manufacturers. It is the co-polymerization product of butadiene and acrylonitrile (vinyl cyanide). Physically, it is characterized by being harder and more nervy than Buna-S. These charactertistics require that relatively large quantities of plasticizer be used in its processing. These plasticizers are usually organic chemicals and in general are

Standing Committee Chairmen C.N.G.A. for 1942-43: Left to right: George L. Tyler, Secretary, Ben C. Drumm, Allied Supply Co.; Chairman, Entertainment Committee; J. B. Taylor, Signal Oil & Gas Co., Chairman Technical Committee; W. W. Robinson, Jr., The Texas Co., President, C. N. G. A.; D. E. McFaddin, Union Oil Co. of Calif., Chairman, Fall Meeting Committee; John H. Kunkel, The Fluor Corp. Ltd., Chairman, Publicity Committee.

harmful to the finished Buna-N products. Certain of them, however, have a very beneficial effect on such properties as resilience and resistance to hardening at low temperatures.

From an engineering viewpoint, Buna-N has provided an excellent tool. It can be processed and manufactured in the same way as natural rubber into products having a wide range of hardness and physical properties. Compared to natural rubber it has greater resistance to the deleterious action of oils, organic solvents, and high temperatures. In these respects it is superior to Buna-S which in turn is better than natural rubber. It is more costly than Buna-S, however, and offers no advantages as a synthetic rubber for tires.

The newest of the three butadiene base synthetics is Butyl rubber. It is made by the co-polymerization of isobutylene and butadiene. So far, very few commercial applications have been found for this synthetic, but doubtless there will be many. Isobutylene is derived from petroleum and hence Butyl rubber is the only synthetic in which petroleum accounts for the entire composition. Butyl differs from natural rubber, Buna-S and Buna-N in that it is chemically a more saturated compound and thus permits a smaller degree of vulcanization. Natural rubber, Buna-S and Buna-N contain many free bonds and can be vulcanized (chemically combined with sulfur or other curing agent) to any desired degree. High sulfur combinations produce vulcanizates of the ebonite type. On the other hand, Butyl rubber will react with only about 1.5 percent of its weight of sulfur and even this reaction is carried out with comparative difficulty. Its high degree of chemical saturation does, however, give a product which is quite resistant to oxidation. There simply are no free bonds with which oxygen can combine and thus bring about the well known harmful oxidation effects. In resistance to oxidation Buna-S and Buna-N are also superior to natural rubber.

So far, we have discussed the three available synthetic rubbers of the butadiene base co-polymer type. Without doubt, many more will be developed and it is quite possible that co-polymers of three, four or even more monomers will show some advantages. There are three other synthetics which appeared on the American scene before the co-polymers and have enjoyed wide commercial applications. All of them differ from the co-polymers in one noteworthy way. They are the polymerization or reaction products of monomers and are seldom vulcanized in the sense as given above. Under the influence of heat, physical changes occur in two of them. This change is similar in effect to vulcanization. As is the case with the co-polymers, each of these species can be produced in a variety of types.

The first of the commercial synthetic rubbers produced in the United States was the polymerization product of chloroprene. This synthetic is now known as Neoprene and is made in a number of types. In preparing it, acetylene is changed into vinyl acetylene which, in turn, is reacted with hydrochloric acid to give chloroprene (C_4H_5Cl). Polymerization of this monomer gives the usable product poly-chloroprene. Neoprene has advantages over natural rubber for certain uses. It is much more resistant to oxygen, ozone, oils, and organic solvents. Satisfactory tire treads have been made from it, but its high cost makes it uninteresting for this application.

The second of the older synthetics is formed by the reaction of an organic halide, such as ethylene dichloride or dichlorethyl ether with sodium tetrasulfide. After polymerization the products from this type of reaction are called Thiokols. These are quite rubber-like and have many applications. They have excellent resistance to oils and solvents and can be processed in the same way as rubber.

The third species is really a group composed of the polymerization products of polyvinyl derivatives. These are saturated compounds and cannot be vulcanized with sulfur or changed by the application of heat as is the case of Neoprene and Thiokol. Among these are polyvinyl alcohol, polyvinyl chloride, polyvinyl acetate and the polyvinyl acetals. Polyvinyl chloride marketed under the name of Koroseal has received the most attention. As made, it is a hard, horn-like substance and not in the least "rubbery". Liberal dosage with organic plasticizer such as tricresyl phosphate gives a product with good extensibility and many rubber-like properties. The material is used extensively as insulation for wire and in many respects is superior to natural rubber for this purpose.

In all these synthetic rubber endeavors petroleum companies, chemical companies and rubber companies play a vital part. The fruition of the program will be a monument to their cooperation and skill.

C. N. G. A. FROLIC

The 1942 Frolic, held June 6th at the Altadena Golf Club, was one of the most successful events of its kind ever held. It was planned as a fun party, without frills, and the turnout of 172 golfers broke many records.

Throughout the day members and CNGA guests actively participated in baseball, horse-shoes, volley ball, tennis, badminton, swimming and "indoor" sports. Early in the evening a buffet dinner was served, followed by two hours of entertainment which was generally conceded above average.

The golf prizes were as follows:

First Flight 1-15: Low gross, Lee Davis; low net, E. Adams, Mr. Griffen and Paul Daniel.

Second Flight 16-25: Low gross, Monte Lindmoe; low net, Monte Lindmoe.

Third Flight 26 Up: Low gross, H. M. Anderson and Les Pickup; low net, H. M. Anderson.

Blind Bogey winners of $3.05 each were J. S. Fluor, Jr., R. A. Ellis, L. J. Batten, W. R. Parrish, M. W. Kibre, F. H. Kratka, L. T. Livingston, B. Vigo, R. D. Gibbs, F. H. Currie, A. J. Fink, H. C. Hill, A. W. Buchanan and Kenneth Vaughn.

The success of the Frolic was due largely to the efforts of Harold A. Dresser, chairman of the Entertainment Committee and his committee members, consisting of Coles Bason, E. L. Bishop, Ben C. Dumm, Glenn J. Gill, Gordon Greene, W. L. Landis and Harold Maxwell, assisted by H. P. Saueressig, John H. Kunkel and P. R. McArthur.

Five pages of pictures in this issue show the hard-working C.N.G.A.'ers on their one-day of play in the year.

Evaluation of Synthetic vs. Natural Rubber

Presented at C. N. G. A. May Meeting 1942

By Carl E. Stentz*

Rubber is one of the most versatile materials known to man. It is used to make barrage balloons, deicers for aircraft, and even ventures into the stratosphere, or down into the bowels of the earth sealing off formations in oil wells 11,000 feet below the surface. It is estimated military requirements alone for 1942 will require 18,000,000 tires, besides the huge amounts necessary for bullet proof self-sealing fuel tanks, motor parts, life rafts, rubber tracks for tanks, gas masks, fire hose, general factory needs, such as belting, hose, washers, etc. Therefore, one can readily see with 97 per cent of our supply of rubber cut off from British Malaya and the Dutch East Indies or approximately 800,000 tons per year that will not be ours in 1943 we then have less than one year's normal supply of natural rubber and rubber of all types must be conserved as never before.

One of the properties of rubber which make it so valuable is its elasticity. Elasticity can be defined as the property of matter by virtue of which it tends to return to its original shape after deformation—stretching, compression or torsion. Elasticity and rubber are closely associated in the minds of most people because of the phenomenal distance to which vulcanized rubber can be stretched without losing its ability to return very nearly to its original shape; in this respect rubber is the most elastic substance known.

Under many conditions rubber will withstand continued application and release of deforming loads even at high speeds and for this reason it is widely used as a sound and vibration dampening medium.

When subjected to an abrasive or cutting action, rubber distorts and so minimizes the abrasive effect that in many cases it is more abrasion resistant than even the best steel.

Carl E. Stentz

In addition to those properties associated with elasticity, rubber compositions have high tensile strength and good flexing properties.

Many Different Compositions

When we speak of the valuable properties of rubber, we are thinking not of the raw material but of finished products made from it. Crude rubber must be mixed with various quantities and types of reinforcing agents, inert fillers and other compounding ingredients; then this mixture must be vulcanized by exposure to heat in order to develop the characteristic rubber-like properties with which we are familiar. Different rubber compositions have a wide range of physical properties which make some particularly well suited for use in one application, and yet entirely unsuitable for use under other conditions.

An important characteristic of rubber compounds is the ease with which they may be combined with other materials. For example, they may be combined with wire and cotton braid in the manufacture of hose, with fabric to make belts, or they may be adhered to metal as in slush pump pistons or for tank linings.

The use of rubber as a material of construction has simplified many design problems for the engineer. For example, a resilient sealing material enables the maintenance of a perfect seal without the necessity of accurately machined surfaces. The availability of a tough, abrasion resisting, resilient material for cable covers makes it possible to insulate and protect a conductor, and still insure the flexibility of the entire product. The elasticity of rubber permits the design of a packing element which can be easily dropped down into a well, then expanded against the sides of the casing to give a perfect seal. Such a sealing member would be practically impossible if an elastic material were not available.

Rubber Limitations

From the foregoing statements one might draw the impression that rubber is a perfect material of construction, but this is not the case. Rubber compositions unfortunately have a number of limitations which seriously restrict their use in many applications. First, rubber products are subject to oxidation. On aging, they deteriorate in physical properties and eventually crack badly. Exposure to sunlight accelerates this deterioration and so does continued deformation, causing cracks to appear at first on the surface and finally all the way through the rubber product. Heat also seriously reduces the life of rubber products causing embrittlement of the surface and eventually causing the whole rubber mass to become soft and sticky. Many chemicals attack rubber and seriously impair its serviceability. But, the most notorious offender is the group of products in which the oil industry is most interested, namely, petroleum hydro-carbons. Exposure to petroleum products causes rubber to swell excessively,

*Plant supt. Sierra Rubber Co. and president Latex Seamless Rubber Products Co.

and this swelling is accompanied by such rapid deterioration of physical properties as to make rubber useless for even ordinary service in a comparatively short time.

It is true that tremendous advances in rubber technology have widened the field for products made from rubber at a constantly accelerated rate by imparting to these products a greater ability to retain their original useful properties even under these difficult service conditions. However, even the best rubber compositions still have many shortcomings.

New Materials

The increased use of resilient materials of construction has created a demand for new materials capable of withstanding service conditions that rapidly deteriorate rubber. Within the last 20 years the chemical industry has assumed the responsibility of providing these new materials.

As a result of their efforts, there are at present on the market several different synthetic products each of which is, in some respects, similar to rubber. However, none has exactly the same composition as natural rubber, and therefore, in the interest of technical accuracy none of them can be called synthetic rubber in the accepted sense of the term.

I am listing below various types in their order of introduction to industry:

Thiokol—Discovered in 1931 by Dr. J. C. Patrick in a Kansas City Laboratory. This material is made by the chemical interaction of ethylene dichloride and a polysulfide such as sodium tetrasulphide.

It is satisfactory for certain purposes from minus 40°F. to about 175°F. It is resistant to gasoline, benzol, acids, certain alkalies (not concentrated caustic soda or ammonia), but has low elasticity and two much flow under pressure for many purposes. It requires compounding with zinc oxide, sulfur, stearic acid, soft black and accelerators to make it of commercial use.

Thiokol Molding Powders are a line of thermo-plastic powders requiring no compounding. They will vulcanize in three to four minutes at 250° to 300° F. under 700 pounds pressure per square inch, and are very impermeable to gases such as hydrogen and helium.

Neoprene — (formerly Duprene). The first commercial production was made in 1931 by the E. I. DuPont Co.

This material is a chloroprene polymer and a simplified version of the steps in the synthesis of chloroprene is as follows:

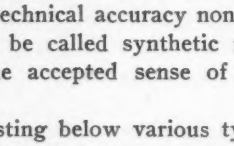
Coal + Limestone = Calcium Carbide
Calcium Carbide + Water = Acetylene
Acetylene + Catalyst = Monovinylacetylene
Monovinylacetylene + Salt = Chloroprene

Chloroprene is a clear liquid which polymerizes to form Neoprene, a solid material similar to crude rubber in appearance.

The modifying agents necessary to secure a good usable compound Neoprene may include magnesia oxide, zinc oxide, accelerators, antioxidents, sulfur, rosin, lubricants and fillers.

At this time I might say that the exact formula of natural rubber is still unknown, however, we do know that it is mainly isoprene and by methods of substituting in the isoprene formula we get:

Isoprene the primary constituent of natural rubber



Methyl group CH_3 replaced by a H atom we get Butadiene.

If the Methyl group CH_3 is replaced by a Chlorine Atom we get Chloroprene.

We will now proceed with other types of synthetics:

Perbunan ("N" Type)

(Made by Standard Oil Company)

1. The oil resistant member of the Buna Rubber Family is a **Copolymer of Butadiene and Acrylonitrile,** GR. 0.97 . . . German & Russian type.
2. Resists aliphatic Hydrocarbon, Mineral oils, animal oils and fats, vegetable oils, printing inks, and paint dryers.
3. Resists petroleum and other oils at normal or elevated temp., resists aging, set, freezing and abrasion.
4. Perbunan vulcanizes with 1.5 to 2.5% Sulphur, need ZnO and fatty acids and accelerators the same as natural rubber.
5. Reinforced with carbon black and soft blacks.

Buna "S"

1. Emulsion Copolymerization of Butadiene and Styrene.
2. Brown crepe, mild odor, GR. 0.95.
3. Nearest to natural rubber.
4. Requires reinforcing pigments such as carbon blacks, clays, whiting and barytes.
5. Also fatty acids and other softeners, also zinc oxide, sulphur, and accelerator.
6. Tensile strength 3000 pounds to 3300 pounds; percent elongation at break, 550%.
7. Cracks begin at one focal point and grow progressively, while in natural rubber there is a multitude of small cracks after considerable aging.
8. Made by Standard Oil Co. of New Jersey and will be used primarily for tires and mechanical goods.

Hycar-Or.

(Made by Hydrocarbon Chemical and Rubber Co., Akron, Ohio.)

1. A modified Butadiene Copolymer.
2. Looks like Amber Crepe Rubber.
3. Gr. 1.00, odor pleasant.
4. Excellent storage stability.
5. Health hazards—none.
6. Compounded like rubber,—using soft black, zinc oxide, plasticisers, stearic acid, sulfur, etc.
7. Mills like rubber.
8. Cures like rubber.
9. Fabricated same as rubber.
10. Most uniform of the Butadiene Types, and processes easily. Can be blended with natural rubber and reclaims in all proportions.

Chemigum X.

(Licensed by Standard Oil Co. of New Jersey; Made by Goodyear)

(Similar to Perbunan and the "X" type is very impervious to solvents.

Buna "N" is made by Firestone and is the same as Perbunan. (Licensed by Standard Oil Co.).

* * *

Rubber substitutes, such as Golden Rod, Guayule, Poinsettia, fig trees, milk weed, have had considerable research work undertaken on them, but yield and quality is low and extraction of latex or rubber milk from them is costly and expensive.

Koroseal, though classified as a rubber substitute is not a true rubber, but is a plasticized polyvinylchloride, and can only be classified as a rubber substitute for certain specific cases.

Rubber extenders have just come into being, they are added to the rubber mix as a filler with compatable properties to the rubber or latex and extend its volume use.

The rubber situation as it stands today may be summarized as follows:

	Tons
1942 production of synthetic rubbers	100,000
1942 inventory of crude rubber at first of year	700,000
1942 Reclaim production	500,000
	1,300,000

Estimated consumption for 1942 is 250,000 tons of crude.

Estimated consumption for 1943 is 500,000 tons of crude.

These two items are for war needs alone, therefore, our inventory of crude rubber will be used up in its entirety before the end of 1943. However, the production of synthetic rubber for 1943 will probably be in the neighborhood of 300,000 tons and in 1944 about 700,000 tons.

We are learning to do things with reclaim rubbers and synthetic rubbers which a year or two ago we thought impossible and it may be through this medium that civilians will be able to obtain a limited amount of rubber for tires and other uses before 1944, as necessity is still the mother of invention.

The vast rubber plantations were not destroyed by the Allies before the on-coming Japs in Sumatra, Malay and the Dutch East Indies (however, the mills, and receiving stations were burned) but due to the climatic conditions in those tropical countries the insects, tree rot and lack of immediate care by continual spraying and treating of the trees against disease they will be destroyed by mother nature in a very short time.

I hereby predict that they will not be replaced and that synthetic rubber made here in our country will in a few years supply the world with the new test-tube rubbers.

C. N. G. A. Directors Annual Meeting

The Annual Meeting of the Board of Directors of California Natural Gasoline Association was held following luncheon June 9. W. C. Dayhuff, Standard Oil Co. of California, retiring president, after expressing his appreciation of the cooperation and help received from committeemen and others during his term of office, turned the meeting over to W. W. Robinson, Jr., The Texas Company, incoming president, with the presentation of a gavel. Mr. Robinson outlined some of the policies proposed for the coming year among which was to be the scheduling of monthly meeting programs of a practical and not too theoretical nature with few so-called entertainment features, the point being that meetings in the future should offer something of direct benefit to warrant the expenditure of time and car use during the emergency.

W. W. Robinson, Jr.

R. W. Heath

Appointment of the following to the Executive Committee of the Association for the Year 1942-43 was approved:

J. C. Burks, O. C. Field Gasoline Corp.; L. V. Cassaday, Lomita Gasoline Co.; F. J. Colton, Tidewater Assoc. Oil Co.; W. C. Dayhuff, Standard Oil Co. of Calif. H. L. Eggleston, Gilmore Oil Co.; J. S. Fluor, Jr., The Fluor Corp., Ltd.; C. D. Gard Union Oil Co. of Calif.; R. D. Gibbs, Union Oil Co. of Calif.; J. C. Gilbert, Barnsdall Oil Co.; R. W. Heath, Signal Oil & Gas Co., and W. A. Kirk, Calif. Southern Oil Co.

H. R. Linhoff, Richfield Oil Corp.; S. F. Magor, The Superior Oil Co.; P. S. Magruder, General Pet. Corp.; G. C. McLaren, Standard Oil Co. of Calif.; Wm. Moeller, Jr., Southern Calif. Gas Co.; H. E. Moulton, C. C. M. O. Company; N. H. Mull, The Texas Company, W. W. Robinson, The Texas Company, T. L. Taggart, Standard Oil Co. of Calif.; R. S. Tulin, Shell Oil Co., Inc.; R. C. Wheeler, General Petroleum Corp.

Standing Committee Chairman appointed for the Year 1942-43 were:

Advisory: R. W. Heath, Signal Oil & Gas Co.; Finance & Budget:

R. S. Tulin, Shell Oil Co., Inc.; Auditing: M. W. Smith, Bankline-Norwalk Co.; Program: Randal Maass, General Petroleum Corp.; Publicity: John H. Kunkel, The Fluor Corp., Ltd.; Entertainment: Ben C. Dumm, Allied Supply Co.; Membership: L. L. Bendinger, Lomita Gasoline Co.; Gas Report: R. D. Gibbs, Union Oil Co. of Calif.; Fall Meeting: D. E. McFaddin, Union Oil Co. of Calif.; Technical: J. B. Taylor, Signal Oil & Gas Co. and Technical Vice-Chairman: R. R. Crippen, The Texas Co.

During the meeting, approval was given to the creation of a C.N.G.A. War Activities Committee whose function it will be to coordinate the aid which the Association can give to the war effort. The personnel of this committee is:

W. W. Robinson, Jr., The Texas Co., chairman; member of California Oil Industry Salvage Committee.

P. S. Magruder, General Petroleum Corp,; representing C.N.G.A. as a member of the Oil Industry Protection Committee.

Wm. Moeller, Jr., Southern California Gas Co.; chairman, Natural Gas and Natural Gasoline Industry Committee, District No. 5.

H. L. Eggleston, Gilmore Oil Co.; chairman, two temporary sub-committees on Natural Gasoline and Isobutane, of District No. 5.

R. D. Gibbs, Union Oil Co. of Calif.; chairman, C.N.G.A. Gas Report Committee.

George L. Tyler, secretary C.N.G.A., ex-officio.

Paul Huggins Heads Conservation Committee

Paul Huggins, Western Gulf Oil Co., was named chairman of the Conservation Committee of California Oil Producers at its organization meeting June 19. Mr. Huggins succeeds Lloyd Williamson, California Star Oil Co., who has been serving as temporary chairman since the resignation of A. H. Bell, Continental Oil Co., several months ago.

Joseph Jensen, Tide Water Associated Oil Co., was elected first vice-chairman; D. L. Caldwell, Barnsdall Oil Co., second vice-chairman; and Henry Power, General Petroleum Corp., secretary. Harold Wyatt, Shell Oil Co., was elected member-at-large.

W. R. Wardner, Jr., who has been serving as Assistant Administrator, was appointed Administrator for the Committee. He has been a member of the staff of the Administrator's office since formation of the California voluntary conservation program in 1929.

The committee is made up of chairmen and vice-chairmen of district committees, elected by producers of the 26 oil producing districts into which the state is divided, together with one representative-at-large. The chairman of the Production Committee for District No. 5 is an ex officio member. With the exception of two districts, in which run-off elections for vice-chairmen will be held, the committee for the current fiscal year is complete.

Two standing committees were elected. The new Administrative Commitee consists of W. H. Farrand, The Texas Company, chairman; Ross McCollum, National Oil Co.; Max App, General Petroleum Corp.; John Sutherland, The Ohio Oil Co.; F. M. Ziegler, Kern Oil Company Limited. New Allocation Committee members are: L. E. Porter, Richfield Oil Corp., chairman; Warner Clark, Standard Oil Co.; J. B. Wharton, Belridge Oil Co.; E. B. Hall, E. B. Hall and Co.; J. L. Stephens, Chanslor-Canfield Midway Oil Co.; D. K. Weaver, Wilshire Oil Co.; and H. C. Pyle, Union Oil Co.

In addition to the elections, the committee heard a report from E. E. Pyles on his recent trip to Washington.

District committee chairmen and vice-chairmen who constitute the membership of the Conservation Committee are:

District No. 1, Max App, Chairman, J. B. Wharton, vice-chairman; District No. 2, H. S. Stark, chairman, W. A. Clark, vice-chairman; District No. 3, John Sutherland, chairman, Carton Beal, vice-chairman; District No. 4, W. S. Fisher, chairman, Frank Wells, vice-chairman; District No. 5, R. S. Lytle, chairman, R. A. Holman, vice-chairman; District No. 6, J. H. Sargent, chairman, R. I. Brown, vice-chairman; District No. 7, Ross McCollum, chairman, F. E. Smith, vice-chairman; District No. 8, R. P. Huggins, chairman, Charles Prewett, vice chairman; District No. 9, H. F. Owen, chairman, A. J. Crites, vice-chairman; District No. 10, J. L. Stephens, chairman, Claude Pearson, vice-chairman; District No. 11, W.B. Jayred, chairman, R. W. French, vice-chairman; District No. 12, Wm. H. Morgan, chairman, L. C. Dougan, vice-chairman; District No. 13, H. C. Pyle, chairman, (run-off for vice-chairman); District No. 14, L. E. Porter, chairman, J. L. Bowen, vice-chairman; District No. 15, Joseph Jensen, chairman, Wm. L. Hobro, vice-chairman; District No. 16, A. H. Bell, chairman, Warren Craddock, vice-chairman; District No. 17, W. H. Farrand, chairman, H. A. Brett, vice-chairman; District No. 18, D. L. Caldwell, chairman, (run-off for vice-chairman); District No. 19, E. Robert Burns, chairman, C. C. Spicer, vice-chairman; District No. 20, D. K. Weaver, chairman, A. M. Anderson, vice-chairman; District No. 21, Warner Clark, chairman, Quay S. Diven, vice-chairman; District No. 22, Wilbur Harrison, chairman, Frank Travers, vice-chairman; District No. 23, F. M. Ziegler, chairman, R. H. Garrison, vice-chairman; District No. 24, Emil Kluth, chairman, Henry Power, vice-chairman; District No. 25, E. B. Hall, chairman, D. D. Dunlap, vice-chairman; District No. 26, George Ring, chairman, D. W. Elliott, vice-chairman.

There are 80 shots at the enemy in a set of brass curtain fixtures, the metal they contain would produce that many cartridges for a soldier's rifle.

American troops are being equipped because of that radio-phonograph Mr. and Mrs. America didn't buy this year. The steel in an average radio-phonograph would make close to a dozen bayonets.

T. S. Petersen On S. O. Board

The board of directors of the Standard Oil Co. of California on June 12 elected T. S. Petersen a director. Mr. Petersen was first employed by this company in 1922

T. S. Petersen

when he was a service station salesman at Portland, Ore. His service in the years to follow has covered a broad field of selling in the marketing area and acting in executive capacities. Since 1932 He has been identified with the home office, for some years holding executive positions in Standard Stations, Inc., and advancing in 1938 from general sales manager of that subsidary to assistant to the president of the Standard Oil Co. of California. At the time of his election to the board he was general manager of sales, marketing department, San Francisco.

COST — MILITARY ITEMS

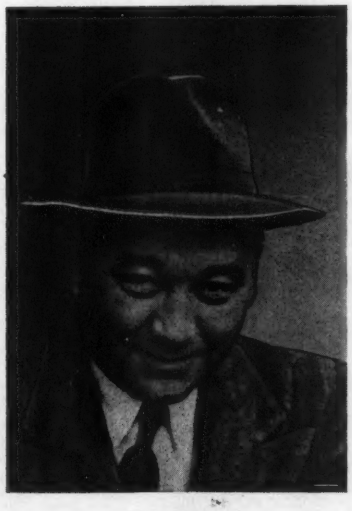
Billions don't mean much to any of us —so here are figures you can really get your teeth in. Multiply any of these by the thousands being built today and you soon see that a billion dollars is just small change when it comes to preparing for today's warfare and why Uncle Sam needs all the help you can give him. Buy bonds—and more bonds. Buy 'til it hurts.

Garand Rifle—$80.00
Machine Gun—$500 to $3,000.
Heavy Case Demolition Bombs—$100 to $500
37 MM Anti-Tank Gun—$6,500
37 MM Anti-Aircraft Gun—$20,000
90 MM Anti-Aircraft Gun—$50,000
75 MM Gun—$10,000
Light Tank—$40,000
Medium Tank—$75,000
Pursuit Plane—$55,000
Light Bombardment Plane—$210,000
Heavy Bombardment Plane—$335,000

Stuart F. Remmel Goes to Washington

Stuart F. Remmel, formerly California sales manager for the Oil Tool Division of Byron Jackson Co., is now connected with the Ordnance Department, United States Army, and has been stationed in Washington.

Stuart F. Remmel



Jack Smith

Another former Byron Jackson associate, Jack Smith, who under the name of Jack Smith Oil Field Service Co., has been servicing BJ Elliott Core Drills in California, also has removed to Washington, where he will be connected with the Ordnance Department.

The steel that goes into a single sewing machine will hake a high explosive shell for a 75 mm field howitzer and the steel in two large outboard motors would make a sub machine gun with which our soldiers could shoot down Japs.

June 15, 1942.

Referring to the press release issued today by Petroleum Coordinator Harold L. Ickes charging Standard Oil Company of California with using the war situation to improve its competitive position in the Pacific Northwest and failing to cooperate with him, Standard Oil Company of California contends it has cooperated and contributed to the fullest extent to the war effort and to the stock situation in the Northwest.

While this Company elected to operate its own tankers instead of following the recommendations that all tankers be pooled, in the firm belief that the tankers could be operated more efficiently in times of stress by the personnel who were thoroughly familiar with their operation, no stock benefit in the Northwest accrued to the Standard Oil Company of California as a result of operating its own fleet because it shared its stocks at Northwest marine terminals on a loan basis down to the last gallon with any and all companies marketing in that area.

Insofar as Mr. Ickes' statement to the effect that Standard Oil Company of California attempted to use the war situation to improve its competitive position in the Northwest is concerned, Standard Oil Company of California denies this statement and on the contrary states definitely that since just prior to the first of this year, the time at which the lack of supplies became acute in Washington and Oregon, it declined to serve customers other than its own because, stocks being limited, it felt that to do so would be taking an unfair advantage of its competitors.

This statement of its policy of declining to solicit or supply business other than its own was embodied in specific instructions issued to its marketing executives in the Pacific Northwest. A full reply to Mr. Ickes' letter of June 6th is now being forwarded to him.

STANDARD OIL OF CALIFORNIA

THIS LAUGH

OFF!!

The battle for Bengasi was in full swing. The colonel of a Scots regiment was jealous of the large number of prisoners the Australians were taking, so he called his men together and offered 2s. 6d. per hundred prisoners brought in.

The next day a Scotsman marched in with 800 Italians; the officer paid him 1 pound, at the same time asking how he had managed to get so many single handed. The Scot replied:

"I bought them from the Australians at a bob a hundred."

Lee Foust picked this one up somewhere:

A judge was pointing out that a witness is not necessarily to be regarded as untruthful because he alters a statement made previously.

"For instance," he said, "when I entered this court today I could have sworn I had my watch in my pocket. But then I remembered I had left it in the bathroom at home."

When the judge got home that night his wife said: "Why all this bother about your watch, sending four or five men for it?"

"Good heavens," said the judge, "what did you do?"

"I gave it to the first one who came; he knew just where it was."

Professor: Oxygen is essential to all animal existence. Life would be impossible without it. Yet, it was discovered only a hundred years ago."

Student: "What did they do before it was discovered?"

"Now. Captain, suppose you found your infantry company cut off from the rest of the battalion, hopelessly outnumbered, and surrounded on all sides by armored forces, what would you do?"

"By George, sir, you are a pessimist."

Then, there's **Bill Bettis' story:**

The occasion was a breach of promise suit. The plaintiff's lawyer was endeavoring to read into the court records a telegram containing the marriage proposal. The defense interrupted to point out that, under court rules, his adversary would have to read, not only the message itself, but all the printed matter on the blank as well. The plaintiff's attorney accommodated him by reading:

"There shall be no liability on account of this message unless the same shall be repeated, and then only on condition that the claim be made within 30 days in writing."

A man had a cello with one string over which he drew the bow for hours at a time, holding his finger in one place. His wife endured this noise for seven months. One night she said quietly, "I have observed that when others play that magnificent instrument, there are four strings over which to draw the bow, and the players move their fingers about continuously."

The man stopped playing a moment, looked at his wife wisely, shook his head, and said: "Of course, the others have four strings and move their fingers about constantly. They are looking for the place. I've found it."

Names used on this page are entirely fictitious, and any resemblance to persons either living or dead is purely coincidental.

1. J. S. Reynolds, T. Barrington, George Christen, and K. C. Tomlinson; 2. Lee Laird, Harold Davis, Pop Atkins, John Augsberger; 3. Ben Dumm, Coles Bason, George Luke Tyler, Ed Bishop, John H. Kunkel, Gordon Greene, Walt Landis, Harold Dresser, and Harold Saurressig; 4. H. Kraemer, Frank Blake, E. P. Donahue, Jim Kibre, E. H. Adams, Harold Beckley. 5. Paul Armstrong, John Rogers, Morgan Washburn, et al. 6. L. L. Jones, Bill Blaska, and Ed Miller. 7. G. Graham, Martin Newell, and Perry Kilsby.

WARTIME PROGRAM

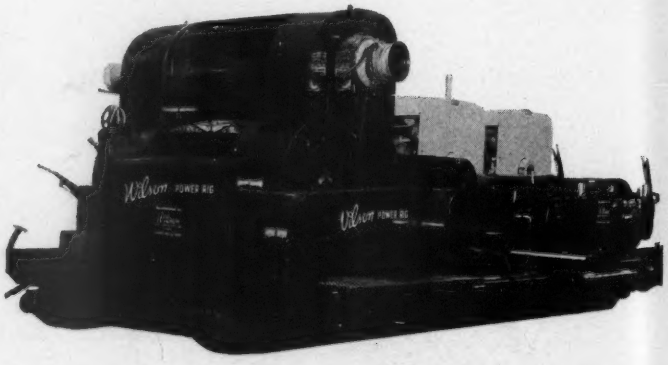
Rental Service

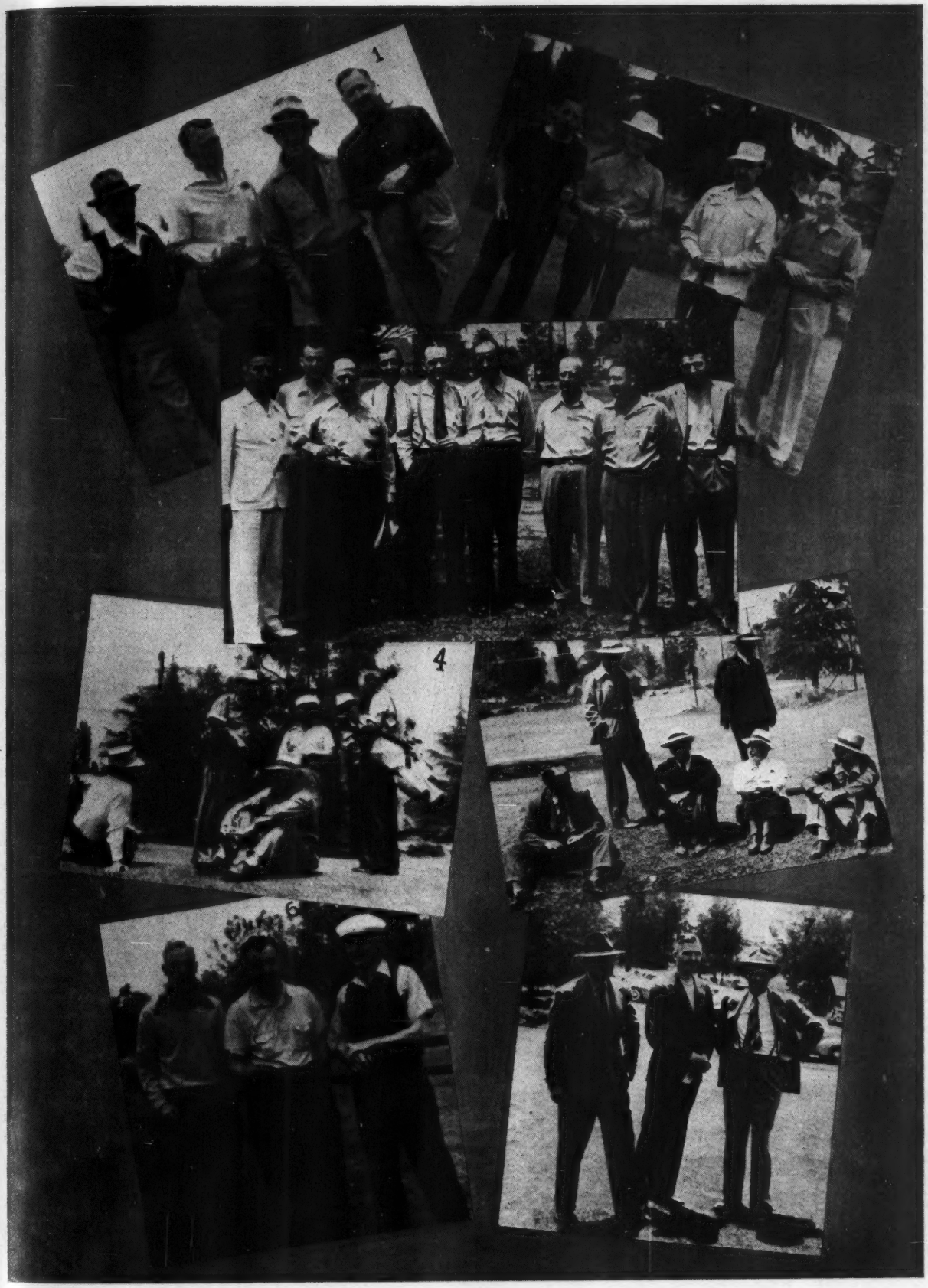
WILSON POWER RIGS

Due to a need for conservation of materials in manufacture and fuel in operation, we are making these economically operated WILSON Power Rigs available to a larger number of companies for drilling essential and authorized wells, on a reasonable rental basis. We have "Titan" Model Rigs (12,000 ft.) and a "Giant" Model Rig (6,000 ft.) illustrated at right. WILSON Power Rigs are famous for economy, speed and dependability.

SERVICE AND PARTS OUT OF LONG BEACH

H & B SALES COMPANY 2875 Cherry Avenue, Long Beach Phone Long Beach 416-59

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Field Development

Los Angeles Basin

San Fernando Test Showing Some Gas

Tide Water Assoc. Oil Co.'s Sesnon No. 1, in sec. 28,3n-16w of the San Fernando area, is continuing tests for commercial gas production. Bottomed at 8912 ft. and with 7 in. casing cemented at 8670 ft. and liner landed on bottom, the well has tested at rates varying from 100,000 to 3,100,000 cu. ft. daily. Volumes are generally low however, with the sands showing little capacity to sustain initial rates. Last production was 1,000,000 cu. ft. rate through a 12/64 in. bean under 1600 lb. pressure, diminishing to a 500 cu. ft. rate after a short flow.

In sec. 30, 3n-15w, near the Los Angeles municipal water reservoir, Barnsdall Oil Co. and Seaboard Oil Co. are drilling T.I.T. No. 1 at 4380 ft. in grayish sand and shale.

Two Continue At Buena Park

In the Anaheim-Buena Park area, The Texas Co. is continuing its search for better production than was effected in its discoverey well, Spencer No. 1. To the east of production in sec. 6,4s-10w, Buena Park One No. 1 is spot coring in oil sand and gray sand at 8755 ft. The well is considered up structure and consequently offering better chances at more volume since the Reppetto was found approximately 150 ft. higher than in the initial well. First saturation was reported near 8450 ft. where a few feet of good oil sands were encountered.

Slightly to the northwest where it is attempting further delineation of the structure the company's Buena Park No. 4-E-1 is drilling down dip at 9069 ft. without having reported correlation markers.

Turnbull Canyon Coring Continues

In the Puente Hills-Turnbull Canyon area, Robert S. Lytle, Operator, is continuing his corehole drilling program. After drilling the full sized Central No. 1 to a barren 5912 ft. in the center of the southeast quarter of sec. 15, 2s-11w, the operator drilled Corehole No. 3 to 678 ft. in fractured shale showing steep dips. Some oil sand was cored in thin streaks below 300 ft. with dips as steep as 90 degrees in spots. Still working to find some sort of promising location in the section, Lytle has spudded Corehole No. B which

→

8. Homer Reed, H. M. Anderson, H. C. Hill, and Pete McArthur; 9. Jack Minaldi, C. Yocum, E. Wycoff, and K. Vandervort; 10. Bill Kinder, C. H. Tuttle, Paul Daniels, W. R. K. Scott; 11. M. B. Niesley, H. A. Van Horn, and Howard Daudistel; 12. Al Barnes, A. L. Mooney, H. W. Havens, and R. A. Ellis; 13. Lee Davis, Fred Currie, John Lucas, and R. E. Dunn; 14. Gus Lagerquist, Bud Kelly, John Gaylord, Mort Newell, and R. Brocklehurst.

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Castaic	Mangold & Morse, McDermott	1	26, 5-17	4315	Idle
	The Texas Co., McNally	A-2	3, 4-17		Location
	Young, Roy W., Inc., Walker	1	11, 4-16	9858	Drilling
La Mirada	The Texas Co., McNally	A-2	15, 3-11	9355	Drilling
Newhall	Airline Oil Co., Perkins	1	11, 3-16	2628	Idle
Palos Verdes	Surety Holding Co.	1	22, 5-14	1480	Cleaning out
Puente Hills	Continental Oil Co., Turnbull	3	13, 2-11	5353	Drilling
	Lytle, Robt. S., Opr., Corehole	A	15, 2-11	678	Abandoned
	Lytle, Robt S., Opr., Corehole	'	15, 2-11	50	Drilling
	Wernsing & Lester, Dragna	1	24, 2-10	1961	Drilling
Rio Hondo	Potrero Oil Co., Newman	1	32, 1-11	5430	Idle
San Fernando	Barnsdall Oil Co., T.I.T.	1	30, 3-15	4380	Drilling
	Fernando Oils, Ltd., Chatsworth	1	18, 2-16		Rig
	Tide Water Assoc., Sesnon	1	28, 3-16	8912	Testing
Whittier-La Habra	Los Nietos Valley Oil Co., Woodward	1	29, 2-11	50	Idle
	Orange County				
Anaheim	The Texas Co., Buena Park	1	6, 4-10	8598	Drilling
	The Texas Co., Buena Park	4E-1	36, 3-11	8651	Drilling
Bolsa Chica	La Bolsa Ro. Synd., Crane	1	22, 5-11	7310	Idle
Costa Mesa	Thompson, Milton N., Banning	1	9, 6-10	5649	Idle
	San Bernardino County				
Carbon Canyon	Stella, E. F., McDermott	2	5, 3-8		Prep. to spud
	Union Oil Co., Newman Bros.	1	2, 3-8		Rig

was last reported in surface rocks at only 50 ft.

In section 13 of the area, Continental Oil Co., who discovered production here, is continuing its Turnbull Community No. 3 at 5353 ft. in hard shale. Already a deep test for the immediate area, the well has shown a few thin streaks of oil sand below 4500 ft.

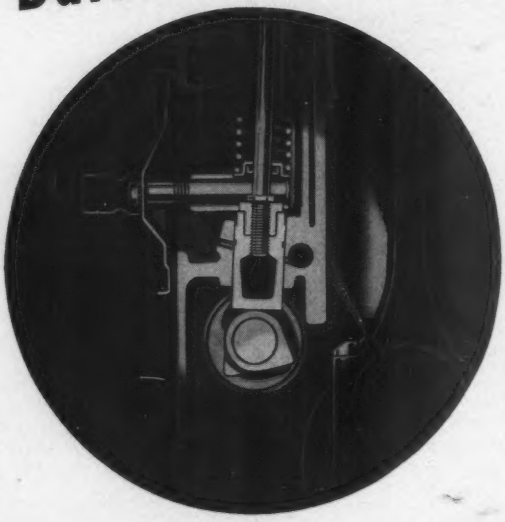
Continental's first well was completed in the same section pumping 300 bbls. of 23 gravity oil from 3447 ft. while its second was finished at 3680 ft. flowing a much higher rate. No other production has thus far been effected.

La Mirada Oil Test Proves Disappointing

Currently sidetracking a drill pipe fish stuck on bottom at 9355 ft., The Texas Co.'s wildcat McNally No. A-2 in sec. 15,3s-11w failed to produce any oil showings on a formation test of the interval 8907 to 9150 ft. Open 3 hours and ten minutes with an 1815 ft. water cushion, the test produced only a light gas blow with some mud and water. No oil showings were noted.

15. H. J. Swan, Fred Salyer, Guy Morrill, and Guy Martin; 16. Frick Gibbs, Gordon Greene, Jess Burks, Tom Taggart; 17. A. Hoover, M. Lindmoe, Pete Fluor, and Cy Fluor; 18. Paul Owen, D. R. Parsons, Mr. Hill, and Mr. Shuhart; 19. S. J. Buckner, Walt Dayhuff, Jim Parks, and Chet Beard; 20. A. Vigo, B. Vigo, D. Johnson, and A. Hopkins; 21. Gilbert Nesheim, Mike Walters, Tom Higgins, and Lin Livingston.

Pressure Lubricated Barrel-Type Tappets!



These Red Seal Continental heavy duty barrel-type tappets have larger bearing area. Adjustment is simple and the lock effective.

Other important features in Red Seal Continental Engines for oil field service are—directional cooling—full length water jacket—interchangeable bearings — counter-weighted crankshaft with precise balancing — internally sealed water pump — and individual porting for quick starting, maximum power, economy, and flexibility.

CHARLES W. CARTER COMPANY

Distributors in

SAN FRANCISCO • LOS ANGELES • SACRAMENTO • OAKLAND • FRESNO

Continental Motors Corporation

MUSKEGON, MICHIGAN

Hathaway To Drill East Coyote Well

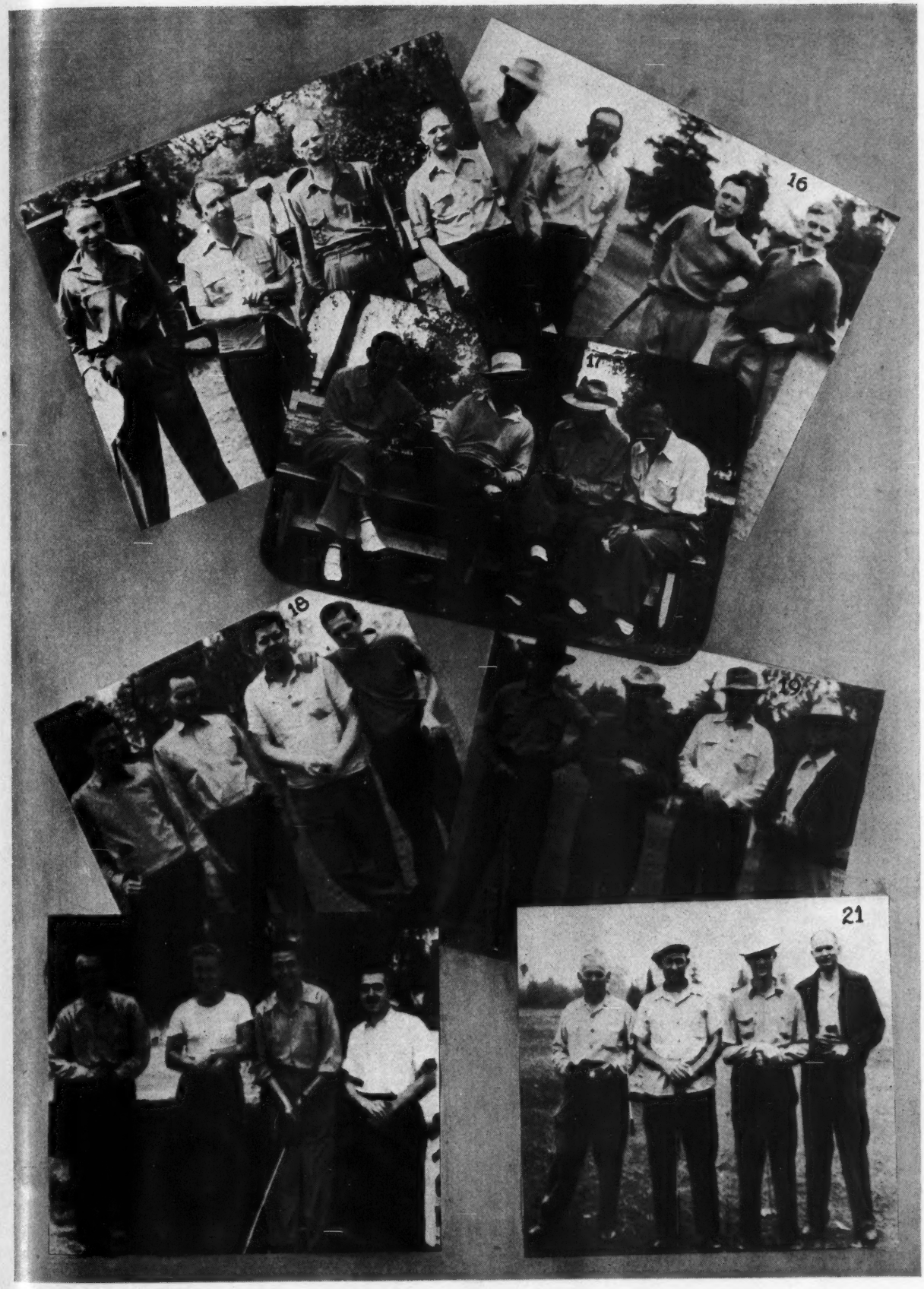
Hathaway Company is preparing to move into Anaheim Union Water No. 6 in the East Coyote field. Rig has been built near the northwest lease corner in sec. 18,3s-9w.

In the nearby Brea Olinda area Union Oil Co. is rigging up to drill Sterns No. 72 on sec. 7,3s-7w while Shell Oil Co. Inc. is understood to plan a grass root job in the Yorba Linda district.

Beach Well Tests Wet

John H. Marion's Fee No. 1 in the Five Points area of the Huntington Beach field tested wet on production trial from a plugged depth of 4155 ft. A combination string was landed at this point and cemented through perforations at 4110 ft. Production trials resulted in large volumes of water and oil necessitating a water witch run. The point of entry was found at the cementing point and the well is presently standing squeezed.

Seal Beach Well Drills

Hellman Estate Co. is drilling its well No. 15 at 3563 ft. under approved spacing provisions. Located on the estates lands northwest of the city of Seal Beach, the well is under contract to the Pike Drilling Co.

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Three Work in Del Valle Field

In the easterly portion of the Del Valle field R. E. Havenstrite, Operator, who discovered the area, is drilling his Barnes No. 2 at 4777 ft. after running an electric log for correlation at 4700 ft. To the west, in the more recently discovered pool of the field, Ohio Oil Co.'s Vasquez No. 3 is drilling in shale at 2231 ft. after cementing a surface string at 603 ft. Standard Oil Co. is spudding its Sepulveda No. 3 as an offset in sec. 17,4n-17w.

Newhall-Potrero Work Resumes

Barnsdall Oil Co. is preparing to drill Rancho San Francisco No. 32 as a further extension of the southeasterly tip of the rich Basin field and will soon resume work on No. 29 at the northwesterly edge of the field, which was shut down at 1241 ft. in January under Order No. M-68 provisions.

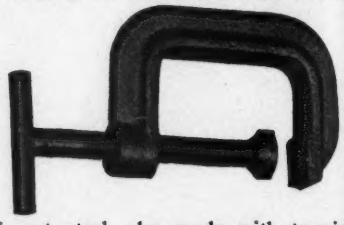
The Texas Co.'s Newhall No. 1, which is seeking extension of the field near the southwest corner of sec. 22,4n-17w, is drilling at 4920 ft.

Tide Water Converting Potrero Well To Gasser

Tide Water Associated Oil Co. is plugging to perforate Cypress No. 3 in the Pacific Southwest No. 1 gas zone. Located in the Potrero field on sec. 34,2s-14w near the town of Inglewood, the well will attempt to duplicate the good gas production obtained by the company when it perforated and completed its old Cypress No. 1 last month. The No. 1 well was plugged and gun perforated in the intervals 5051 to 5058 ft. and 5072 to 5082 ft. and completed flowing 2,111,111 cu. ft. of gas.

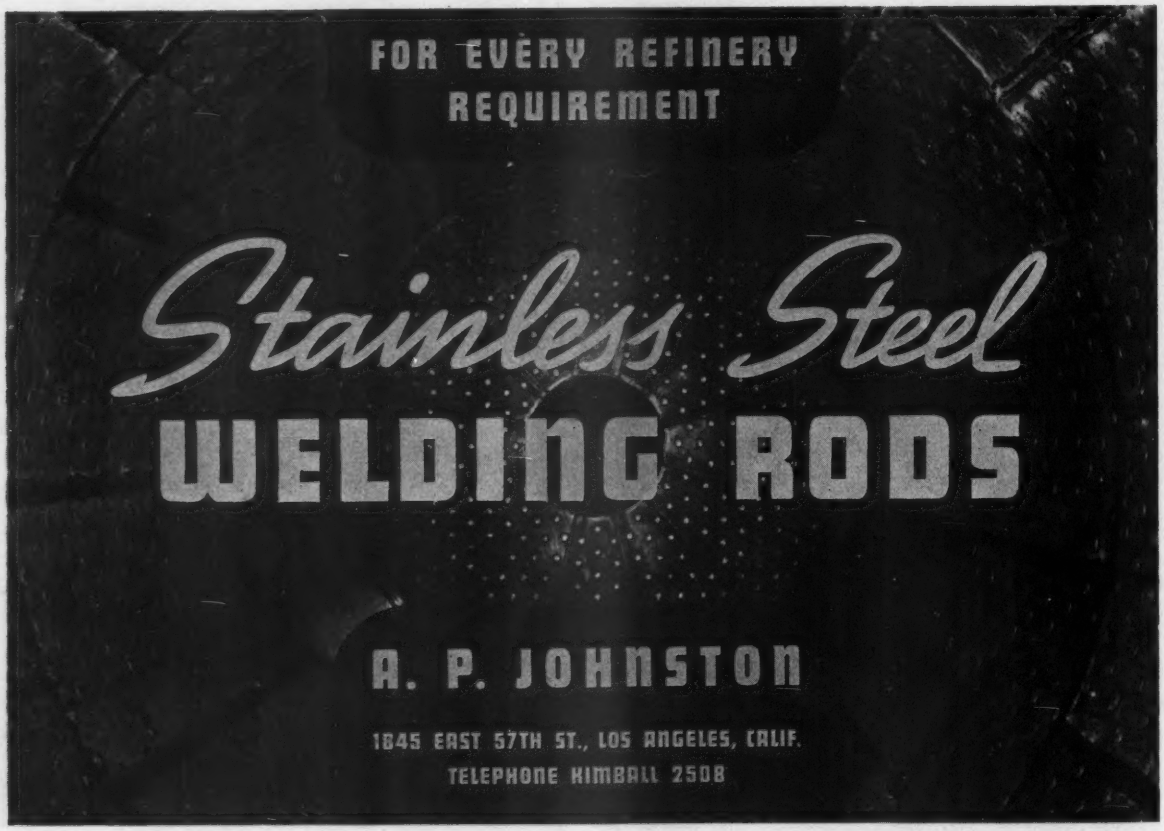
Heavy-Duty Non-Skid Clamp

A different type of C clamp with non-skid features has been designed by Patterson-Ballagh Corp., which prevents skidding when tightening. The clamp tip is equipped with a bronze bushing in which the end of the screw rotates. The screw is made of heat-treated steel. This bushing prevents galling and provides a free movement so that slippage on the work is prevented. The frame is made



of cast steel, also made with terminal lug for use on grounding cable during arc welding. A welded T-shaped wrench handle allows a firm grip. Details may be obtained from Patterson-Ballagh Corp., 1900 E. 65th St., Los Angeles, Calif.

22. H. W. Morgan, Les Pickup, W. I. Thrall, and W. Kindred; 23. J. L. Brown, Don Metz, B. K. Phillips, and Jack Graves; 24. Dale Russell, and Walter Monroe; 25. J. B. Hughes, M. J. Burress; W. E. Landis, and H. E. Leedy; 26. H. L. McCarty, W. McGraw, and Phil Lipschultz; 27. H. P. Keans, Ray Powell, Ralph Cutler, and H. Sorenson; 28. George Stevenson, R. W. Campbell, A. Bleininger, W. R. Beddow, and J. J. Delaney.



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San Joaquin Valley

Burrel Test Flow Freezes Gas Traps

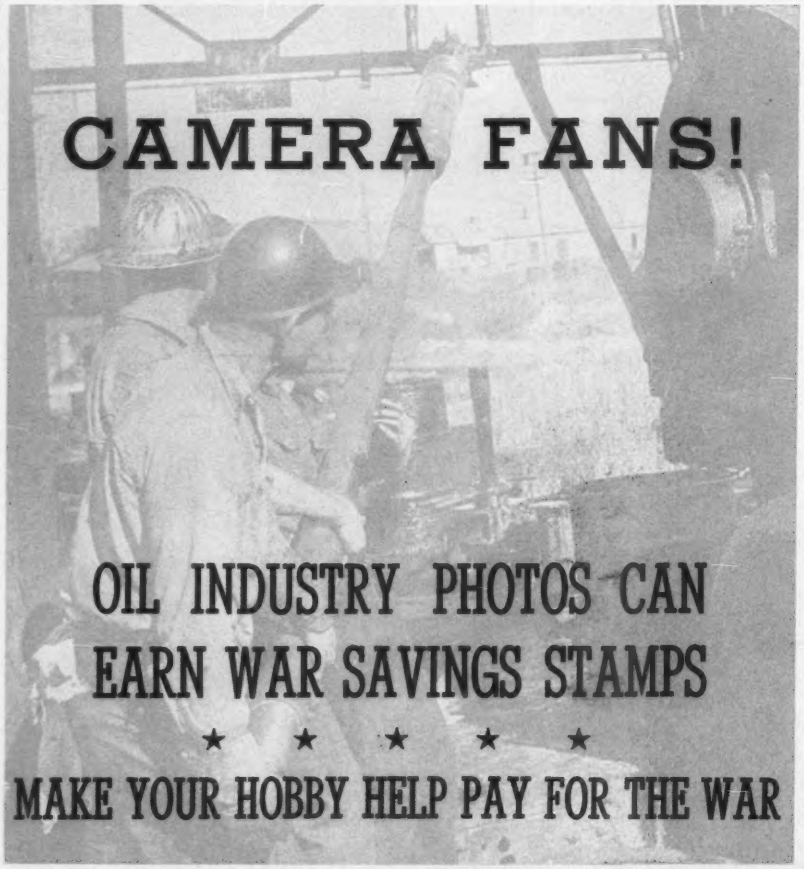
Rapid expansion of large gas volumes flowing through the traps, froze the surface equipment of Amerada Pet. Corp.'s Truman No. 1 after only three hours of production trial from plugged depth of 8020 ft. After freeing the traps of their ice burden the well was again tested and flowed wet. At last report the operators were running a water witch to determine the point of entry.

Located in sec. 6, 17s-18e, four and a half miles southeast of the Helm producing area of Fresno county, the wildcat was bottomed in barren Cretaceous at 8295 ft. and plugged back for trial of lower Eocene gas sands from 7970 to 8020 ft. An open hole test of the interval flowed gas at an estimated 10,000,000 cu. ft. and recovered a small amount of 55 gravity distillate. Seven inch casing was cemented at the top of the zone and five inch liner run for the imperfect trial results.

The company has located Whitty No. 72-1 on sec. 1, 17s-17e, in search of other Fresno county productive sands.

Antelope Hills Try Misses Saturation

At the south flank of the heavy oil production which Shell Oil Co. Inc. recently found in sec. 6, 28s-20e, C.C.M.O. Co. abandoned Antelope Fee No. 7-1 near the north line of section 7. Bottomed in Kreyenhagen shale at 3643 ft. the well found the discovery zone contained only scattered oil spots in the sands from 2141 to 2161 ft.



To stimulate the War Bond and Stamp Savings campaign, CALIFORNIA OIL WORLD offers Oil Industry camera fans an opportunity to swell their investment in America through the pictures which they have always taken for fun. FOR ANY ACCEPTABLE OIL INDUSTRY PHOTO WE WILL PAY $2.50 IN WAR SAVINGS STAMPS.

●

TO collect $2.50, or SEVERAL TIMES this sum, in War Savings Stamps you need observe only the limited rules outlined below.

●

1. Submit good photographic print or negative (negatives will be returned) of any shot showing oilfield, refining, natural gasoline, pipeline or oil administrative activity in any CALIFORNIA area.

2. Submit group photographs of oilfield drilling crews, pipeline crews, refinery staff groups, important meetings or individual photographs possessing current news value.

3. Photographs must be of recent date and properly identified as to time, event and place, and contain the names of identifiable persons in the shot.

●

Remember there is no limit on the number of entries; send every shot which you consider worthy of publication. Editorial credit will be given successful entries, so pack your shots with drama—activity—composition—news—interest. Fill an album with War Savings Stamps by sending your photographic efforts to—

PHOTO EDITOR

CALIFORNIA OIL WORLD

SUITE 1009 — 939 SO. BROADWAY — LOS ANGELES, CALIFORNIA

"AMAZING" said the inquiring reporter "... to what do you attribute your long life, Mr. Tiger Brand?"

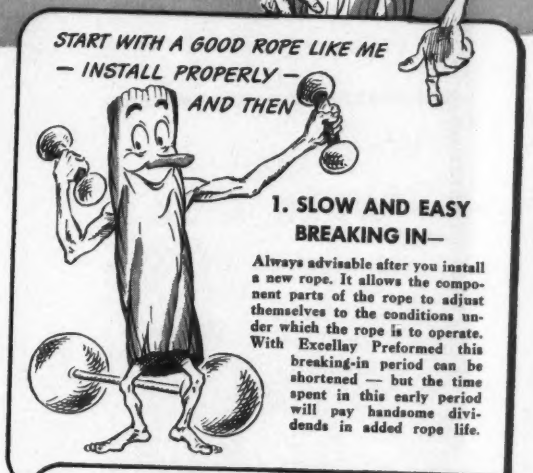
AMERICAN Tiger Brand Wire Rope is built to give hard, continuous service. But even good wire rope like Tiger Brand, that's famous for its long life, won't last as long as it should if the simple, fundamental rules of wire rope care are ignored or followed haphazardly. So if you want long-time performance with a minimum of trouble, make it a point to use Tiger Brand and give it the care a good product deserves.

Here's a book that shows how. 48 pages, packed with practical information on wire rope handling and care, based on the experience of thousands of rope users. Send for as many copies as you need and get them into the hands of your operating men. Make sure that they follow the suggestions it offers, faithfully and consistently, and your ropes will work better and last longer. Remember, every broken rope is a break for the enemy.

COLUMBIA STEEL COMPANY
San Francisco

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

United States Steel Export Company, New York



1. SLOW AND EASY BREAKING IN—

Always advisable after you install a new rope. It allows the component parts of the rope to adjust themselves to the conditions under which the rope is to operate. With Excellay Preformed this breaking-in period can be shortened — but the time spent in this early period will pay handsome dividends in added rope life.

2. CORRECT LUBRICATION. Lack of proper lubrication is one of the most common causes for premature failure. Lubrication is required not only to protect the rope externally, but it must have sufficient penetrating power so that it will protect the inner wires against corrosion and friction. So be sure to give your wire rope periodical and careful lubrication.

3. DON'T FORGET SHEAVES

—they are of prime importance in prolonging rope life. Your sheaves must be of ample diameter to prevent excessive bending stresses in the rope. Sheaves must fit the rope—too narrow grooves will pinch and distort the rope; with too wide grooves the rope will flatten from lack of support. Worn sheaves prevent proper seating and play hob with the best of rope. And sheaves need lubricating, too.

Excellay Preformed

UNITED STATES STEEL

Shell Oil Co.'s second well, Williams No. 67-6 southeast of discovery, was completed as a gasser at plugged depth of 2190 ft. after failing to find a good oil zone to 3498 ft.

The results of past drilling serve to indicate that extension drilling may have been off the preconceived axis or that production lies to the northwest of the initial well.

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Three Work In South Valley

Three strings are actively engaged in south San Joaquin Valley exploration. In the Commanche Point area L. E. Barat Syndicate spudded Ham Jones No. 1 in sec. 5, 11n-18w and was last reported drilling at 250 ft. This play is on a portion of the Tejon Rancho where Pacific Western & G. F. Getty recently took some protection acreage.

South of here Reserve Oil & Gas Co. is preparing to move into Tejon No. 33-5 to seek better accumulation than was found in the original Grapevine Pool completion. Located 330 ft. south and west of the east quarter corner of sec. 33, 11n-19w the well lies east of the pool in what is considered an up-structure position. Since the first well indicated only an edge condition it may be

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30. O. W. Chonette, Frank Bergeron, and K. C. M. Anderson; 31. Al Pickard, C. H. Britican, L. Shaw, Gregg Lifur, and W. H. Orth; 32, Frank Burt, Ernie Adams, Scottie Blair (caddie), Elmer DeMaris, and Bob Woods; 33. J. P. Harris, M. C. Alcorn, W. H. Bigelow and F. B. Applegate; 34. G. Corfield, R. Few, Harry George, and F. Foster.

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Burrel	Amerada Pete Corp., Whitty	1	1, 17-17		Location
	Amerada Pet Corp., Truman	4-6	6, 17-18	8295	Testing
	Richfield Oil Corp., Schultz	1	27, 16-18	7801	Abandoned
Guijarral Hills	Lytle, Robt. S., Opr., Well	68-28F	28, 20-16	10090	Drilling
Helm	Amerada Pet. Corp., Weyant	37-27	27, 16-17	8160	Testing
	Amerada Pet. Corp., Clover	75-34	34, 16-17		Grading roads
Jacalitos	Wilshire Annex Oil Co.	23-26E	26, 21-15	3787	Idle
	The Texas Co., Ferguson	1	32, 21-16		Location
Mendota	Jergins Oil Co., Cheney Ranch	3	30, 14-13	7803	Drilling
Riverdale	Amerada Pet. Corp., Clemente	74-22	22, 17-19	6840	Rng. casing
	Amerada Pet. Corp., Zanolini	38-23	23, 17-19	6840	Swabbing
	Amerada Pet. Corp., Lawton	58-26	26, 17-19	11620	Drilling
	Kern County				
Antelope Hills	C.C.M.O. Co., Antelope Fee	7-1	7, 28-20	3643	Abandoned
	Shell Oil Co., Inc., Williams	67-6	6, 28-20	3419	Completed
Comanche Point	L. E. Barat Synd., Ham Johns	1	5, 11-18	216	Drilling
Devils Den	Moran, Robt. B., Opr., Beer	1	19, 26-19	1447	Idle
Edison	M.T.M. Associates, Well	1	23, 30-30	956	Idle
Grapevine	Reserve Oil & Gas Co., Tejon	33-5	33, 11-19		Foundation
	Richfield Oil Corp., Tejon Ro.	3	7, 10-19	7870	Drilling
Kern Front	Standard Oil Co., Well	42-9	9, 28-27		Rigged up-Idle
Kettleman-So.	Bristol Oil Corp., Hellman	1	2, 25-19	2174	Idle
McKittrick	Americal Pet. Inc., Americal	1	2, 30-21	3584	Drilling
McKittrick Front	Westates Pet. Corp., Kimball	3	32, 29-22		Location
Midway-NW.	C.C.M.O. Co., Thomas	1	1, 31-21		Location
	C.C.M.O. Co., Well	24-1	1, 32-22		Location
Midway-SE.	The Texas Co., P.U.P.	2	33, 11-23		Grading
Mt. Poso	Delaney, Fred G., Well	1	12, 27-27		Location
	Recovery Oil Co., U.S.	1	34, 26-28	1398	Redrilling
	Trico O. & G. Co., Glide	1	1, 27-27		Rig
	The Texas Co., Lambert Lds.	1	29, 26-28	1680	Drilling
	Vedder, Dwight G., Glide	29-2	29, 27-28	2270	Drilling
Paloma	Gen. Pet. Corp., Gallagher	61-33	33, 31-26	7544	Idle
	West'n. Gulf Oil Co., L.A.C.	36-1	1, 32-26		Foundation
Shale Hills	Tideland Oil Co., Grant Est.	1	4, 27-28		Idle
	Kings County				
Alpaugh	Elmer C. vonGlahn, Well	1	4, 23-22		Rig
Pyramid Hills	Miesse, Richard S., Jackie	1	22, 24-17	315	Idle
	Pac. O. & G. Dev., West Slope	2	20, 24-18		Location
	Tulare County				
Tulare	Richfield Oil Corp., Churchill	1	35, 20-24	400	Drilling
Terra Bella	Stout, Geo. W., Stout	2	11, 23-27	745	Idle
Trico	Trico Oil & Gas Co., T.W.A. Fee	1	16, 24-23		Prep. to spud
	Trico Oil & Gas Co., Lee	2	17, 24-23	2485	Completed

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finally necessary to move to the west with another well to thoroughly prospect the immediate area.

To the west, near the main Grapevine Highway, Richfield Oil Corp. is continuing Tejon Ranch No. 3 with depth last marked at 7890 ft. Located near the west quarter corner of sec. 7, 10n-19w the prospector is the latest of many to try the potentialities of the company's vast south Valley leaseholds.

Trico O & G Hits On Extension Try

Trico Oil & Gas Co. succeeded in extending the Trico Gas field to the center of sec. 17, 24s-23e by completing Lee No. 2 for a total flow of 27,170,000 cu. ft. Located a half mile west of Lee No. 1, recently abandoned at 2475 ft. after finding only meager showings, the successful outpost bottomed at 2485 ft. after finding the top of the zone near 2415 ft. The large volume was obtained by flowing nearly 20 million feet through the casing with a 1 in. bean and the remainder through an open tubing bean.

The company is currently undertaking further extension by preparing to drill near the center of the adjacent section 16 on Tide Water Assoc. Oil Co. fee owned lands.

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Mendota Well Below 7300 Ft.

Cheney Ranch No. 3, drilling under joint offices of Jergins Oil Co. and Superior Oil Co. in sec. 30, 14s-13e, was last reported in hard sand showing a few amber cuts at 7303 ft. It is believed that the well is in Cretaceous age formation although no markers have been released on the try. A formation test of the interval 6900 to 6933 ft., where better cuts were found, failed when the packer slipped.

von Glahn Starts Alpaugh Wildcat

Elmer C. vonGlahn has built derrick for a projected 11,000 ft. wildcat west of the town of Alpaugh in Kings county. Situated 1340 ft. south and 330 ft. east of the northwest corner of sec. 4, 23s-22e the well is in the center of 25,000 acres embraced by the play.

New Well Planned In Rio Bravo Field

Superior Oil Co. is planning resumption of Rio Bravo development and has staked location for Osborne No. 2-1 990 ft. north and 330 ft. west of the south quarter corner of the southwest quarter of sec. 28, 28s-25e.

Valley Development Gaining Impetus

Wildcatting for new or extension production as well as consistent drilling up of known heavy oil reserves and partial development of particularly needed light oil deposits is continuing to gain in the San

Joaquin Valley. With the accent on development which will strengthen California's existing stocks of fuels suitable to modern military needs, local operators are doing their level best to find additional reserves.

Currently drilling or preparing to spud for exploratory purposes are 28 strings of wildcat tools while in the proved and semi-proved sections of the Valley 40 strings are actively engaged.

Two Operators Active In Madera County

Pacific Western Oil Co. & George F. Getty is drilling Clifford No. 1 in the Berenda area of Madera county. Bottomed at 390 ft. in loose shale, the well is being drilled ahead to a firmer formation before an attempt is made to cement surface casing. The drilling contract is held by Dunlap & Graham.

The other operator in the area is Thomas E. Blake, who has rig up on Chuck 1, in sec. 28, 10s-17e.

Heyns Market Analyst For District 5 Office

Announcement has been made by C. B. Garretson, Director of Marketing, Office of Petroleum Coordinator, District Five, of the appointment of C. E. (Ernie) Heyns as Senior Marketing Analyst for that office, which is located at 855 Subway Terminal Building, Los Angeles.

C. E. Heyns

Mr. Heyns is widely known in the Pacific Coast industry with a background of 18 years' experience with a major company with whom he held various positions throughout the Pacific Coast area. More recently, he has been a marketing executive with one of the California independent refiners.

Mr. Heyns' new duties have to do with the many marketing and distribution problems which come to the Office of the Petroleum Coordinator for War, and at present he is dealing particularly with situations in the States of Oregon and Washington, where War Production Board Orders L-56 and L-70, governing fuel oil and gasoline deliveries are in effect.

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Coastal District

Continental Deepening Holser No. 1 at Piru

Continental Oil Co.'s Holser No. 1., wildcat on the Ramona anticline in the southeast corner of Ventura county, is deeping in shale and streaks of oil sand at 4535 ft. after production tests at 4344 ft. showed a swabbed recovery of 30 barrels a day rate of 32 gravity oil.

With these modelo sands meager further attempts are being made to contact lower Miocene sands which will correspond to the zone below 5000 ft. in the Oak Canyon field.

Bell Continues Cat Canyon Play

Still hoping to discover a productive deep zone at the north end of old West Cat Canyon field, Alphonzo E. Bell Corp. is swabbing its Gilmore No. 1 after gun perforating 7 in. casing with 20 ¼ in. shots in Sisquoc sands from 3080-3100 ft. Deepened to 6457 ft. after tests of the interval 4930-6377 ft. lacked fluid, the well was given another swabbing test which recovered 50 bbls. of 14 gravity oil, cutting 10% fresh water, with the fluid level at 4400 ft.

Ivers Completes Sespe Wildcat

H. A. Ivers' Ventura county wildcat, Kentuck 13½, located in section 1, 4n-20w approximately two miles west of the Sespe field, was completed at a depth of 1615 ft. with 458 ft. of 8⅝ in. blank liner landed at 1135 ft. Idle during April because of rains, activity was resumed the second week of May and 4¾ in. liner including 200 ft. of perforations was landed on bottom with 2 in. tubing at 1608 ft. The well was placed on the pump for 25 barrels a day of 25 gravity oil cutting 5%.

Union Oil Co. Active at Santa Maria

Union Oil Company deepened its Moretti No. 3-4 through 5½ in. liner to 5279 ft. in Franciscan deposits, after a production test at 5084 ft. lacked fluid. Located on the west flank of the Santa Maria Valley field in section 15, 10-35, the well is now being swabbed, following the running of 273 ft. of 4 in. liner including 216 ft. of perforations landed at 5277 ft. Franciscan production is hoped for, the top of the zone being encountered at 5255 ft.

Located in the same section is Mathison 1, which is currently being rigged up. The company's current drilling program in this area is rounded out with the rigging up of Stinson No. 8 in section 8, 10-34, pouring of foundation for LeRoy No. 9 in section 14, 10-35, and the staking of location for Union Sugar No. 15 in section 19, 10-34, 1320 ft. west of Union Sugar No. 14.

In the Santa Maria Valley Old Field, Union Oil Co.'s Squires No.

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
	San Luis Obispo County				
Carrizo Plains	Richfield Oil Corp., Blakey	1	20, 31-20	2462	Abandoned
	Santa Barbara County				
Cat Canyon	Alphonzo E. Bell Corp., Gilmore	1	23, 9-33	6457	Testing
Lompoc	Alphonzo E. Bell Corp.. Lompoc	6	28, 8-34		Graded roads
	Fickert Oil Co., Ltd., Well	1	8, 7-33		Rig
Los Olivos	Tide Water Assoc O. Co., Davis	1	33, 8-31	2762	Drilling
Orcutt	Standard Oil Co., Rice Ranch	1	14, 9-34	7440	Drilling
	Ventura County				
Bardsdale	Atha, George C., Assoc. Flory Beach	11	17, 4-19		Grade
	Hopland Oil Co., Well	1	1, 3-19	4634	Idle
	Santa Marino Oil Co., Elkins	1	7, 3-19		Grade
	Ventura Southern Oil Co.	G-1	19, 3-19	4179	Prep.to deepen
Conejo	Sycamore Oil Co., Boylan	1	23, 1-20	2590	Drilling
	L. A. Basin Oil Co., Well	1	4-1-20	561	Drilling
Eureka Canyon	Phillips & Nichols, Well	2	33, 4-18	200	Rng. casing
Ojai	Coates, Spencer D., Pirie	5	7, 4-22	726	Drilling
	Kelalee Pet. Co., Harvey	1	8, 4-21		Rig
	Richfield Oil Corp., Ojai	44	13, 4-22	8645	Rigging pump
Piru	Continental Oil Co., Holser	1	14, 4-18	4535	Deepening
	Delroy Pet. Corp., Fisk C. H.	1	22, 5-18	2280	Idle
	Pacific Western Oil Co., Temescal	12	4, 4-18	2046	Drilling
Red Mountain	Shell Oil Co., Inc., Wood	1	7, 3-23	511	Drilling
Sespe	Alford Drlg. & Expl. Co.	1	18, 4-19	2581	Idle
	Highland Drilling Co., Cosby	1	14, 4-19	1996	Idle
	Ivers, H. A., Kentuck	13½	1, 4-20	1615	Completed
Timber Canyon	Crude Oils., Inc., West	1	19, 4-20	958	Idle
	Denison, A. T., Denison	1	13, 4-21	1625	Cleaning out
	Henderson-Ortez Oil Co., O'Leary	1	29, 4-20		Rig
Torrey Canyon	Union Oil Co., Torrey	60	5, 3-18		Location

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Colusa	Pacific National Pet. Corp.	1	17,17n-4w	1402	Idle
Contra Costa	Tide Water Assoc., Bethel Is.	1	9, 2n-3e	4845	Drilling
Madera	Blake, T. E., Chuck	1	28, 10s-17e		Rig
	Pac. West'n. & G. F. Getty, Clifford	1	12, 9s-17e	390	Drilling
Merced	T.W.A.-Seaboard Oil Co.'s Turlock Land	37-18	18, 6s-11e		Rigging up
Monterey	Loma Grande Oil Co., Corey	1	23,24s-10e	4318	Swab'g. water
San Benito	Superior Oil Co., Reay	1	35,16s-11e	2093	Drilling
	The Texas Co., Henderson	1	33, 16s-12e		Location
San Joaquin	Standard Oil Co., Blewett Com.	3	23, 3s-6e		Rig
Solano	Standard Oil Co., Suisun Com.	2-1	25, 3n-1w	6810	Drilling
Stanislaus	Don Pedro Oil Co., Newman	1	9, 6s-9e	4074	Flowing water
Sutter	Buttes Oilfields Inc., Buttes	8	28, 16n-2e	5561	Idle
Yuba	Wright, L. G., Cox	1	18, 14n-5e	1805	Idle

24 is bottomed at 3912 ft. in oil sand with streaks of brown shale. 5½ in., including 373 ft. of perforations landed at 3910 ft. is standing cemented through perforations at 3530 ft. with 400 sacks under 1100 lb. pressure. Top of the third zone was reached at 3486 ft.

Shell Extends Ventura Production

Shell Oil Co., Inc., completed an important outpost extension well on the north flank of the Ventura field when it brought in Taylor No. 154, flowing 2458 barrels of clean 30 gravity oil, and 1836 MCF gas on open flow. 1366 ft. of 5 inch liner was landed at 9745 ft. and perforated in the intervals 9745-9604, 9566-9258, 9220-8971, 8931-8420 with 2½ in. tubing at 9613 ft.

Already one of the primary producing areas in California because of its size and production of oil and gas suited to military needs, Ventura Avenue has indicated added reserves with the successful completion of this well. The high rate of production characteristic of the field was sustained as its limits were pushed northwesterly, and the exact boundary of this producing area is not yet defined.

Shell is planning to drill two additional wells on the Taylor lease. Number 146 is rigging up to deepen after being shut down by order M-68 in January of this year at a depth of 2861 ft. Location has been staked for No. 155, 379 ft. south and 11,106 ft. west of C.L. No. 11, to the southwest of number 154.

Further exploration of the area is planned by the Poinsettia Oil Co., which proposes to drill a semi-wildcat well in the Frasier property, on the central north flank of the field.

Rio Vista Production Furthered By Texas

Rio Vista Gas Field production was furthered with the completion of The Texas Company's Huth Unit 2, in sec. 28, 4n-3e at a depth of 3886 ft. With 5½ in. liner including 65 ft. of 4 mesh perforations landed at 3886 ft., and cemented through perforations at 3822 ft. and with 2½-in. tubing at 3870 ft. the well was completed through at 32/64 in. bottom hole bean for 9,740,000 cu. ft. of gas with 1500 lb. flow pressure.

Remaining activity in the field is being carried on by the Brown Drilling Company, which moved in a portable mast on Standard Oil Co.'s Midland Fee 1-2 in the southeast corner of section 5, 3n-3e. Similar activity will follow immediately on the company's McCormack-Shafer No. 1, which is located 2900 ft. south and 273 ft. east of the northwest corner of section 16, 3n-3e. Amerada Petroleum Corp.'s C. E. Upham 1, drilled to 92 ft. in sand and shale by the Brown Drilling Co., is at present idle in section 19, 3n-3e.

Standard Employes In Record Bond Drive

Climaxing a whirlwind two-weeks "sign-up" drive by employe committees, over 98 per cent of the employes of Standard Oil Co. of California have pledged themselves to invest 10 per cent or more of their income in United States War Bonds. This is in response to the request for such pledges from President Roosevelt and Secretary of the Treasury Morgenthau. It is believed to be the largest employe sign-up on the Pacific Coast.

Celebrating the success of the drive, special ceremonies were held at nine key points in Southern California June 16. Each was presided over by G. J. O'Brien, assistant to the president of the Standard Oil Co. of California. Karl Kellogg of the War Savings Staff of the Treasury Department awarded to employe chairmen the famous Minute Man flags to be flown over their respective plants and offices in recognition of this magnificent effort. Mr. Kellogg expressed keen satisfaction over the results of the drive and voiced the belief that similar results would be attained throughout all industry.

Standard of California's War Bond campaign officially opened on May 31 with a radio address by President H. D. Collier. "The response of our employes to President Collier's radio appeal has been outstanding", said Mr. O'Brien. "Our personnel has enthusiastically joined the War Bond Army, giving concrete evidence of all-out support of the Government's war effort, and the efforts of over 2,000 Standard of California men who are now in the Armed Forces."

BUY DEFENSE BONDS

John R. Richards, Chairman of the War Savings Committee, Treasury Department, awards Treasury Bull's-eye flags to chairmen of Standard Oil Company of California employes' committees. Left to right: W. L. Johnson, Marketing Department; W. J. Tait, Personnel Department; J. W. Milett, General Chairman; John R. Richards.

Two Wells Resume San Benito Exploration

Exploration in the eastern edge of San Benito county in the Ciervo Area is being resumed with the staking of locations by The Texas Company and the Superior Oil Co. The former plans to drill Henderson No. 1 in section 33, 16s-12e. The company's Carter No. 1 in section 3, 17s-12e was abandoned in December of 1941. A formation test in Carter No. 1 of the interval 2650-2857 ft. recovered 8½ stands of fresh water with no oil or gas showings, after encountering Cretaceous at 3240 ft.

Of particular interest in connection with Superior's Reay No. 1, located 1500 ft. north and 330 ft. east of the southwest corner of section 35, 16s-11e, is the remarkable drilling speed obtained in reaching a bottom of 2093 ft. through some very hard sand and shale formations.

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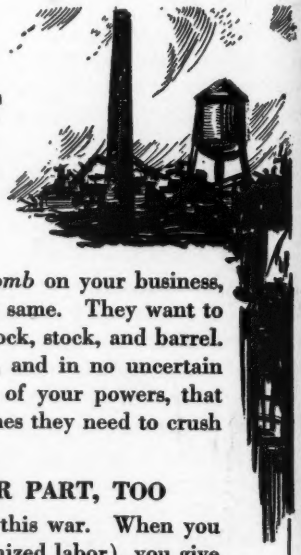

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